

AD-A109 990

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY PALISADES NY

F/6 8/3

ARCTIC ICE DYNAMICS JOINT EXPERIMENT 1975-1976 PHYSICAL OCEANOGRAPHY (U)

FEB 80 T O MANLEY, K HUNKINS, W TIEMANN

N00014-76-C-0004

UNCLASSIFIED

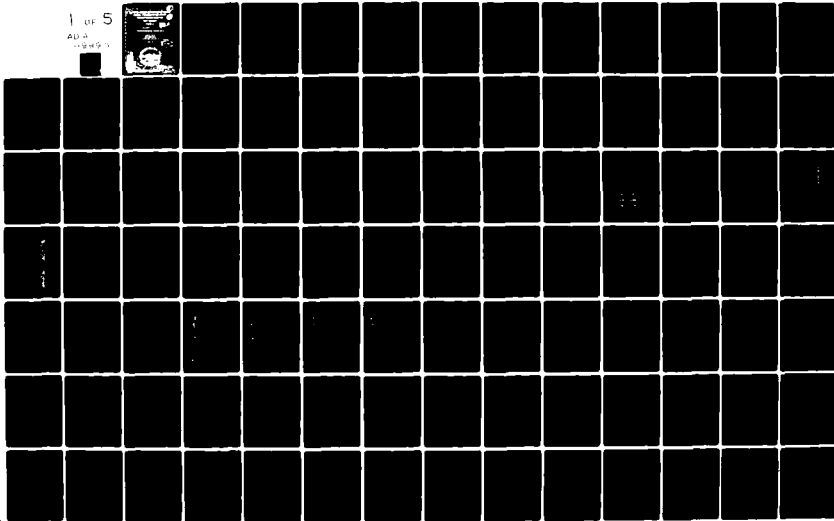
LD60-CU-6-80

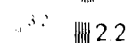
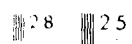
NL

1 OF 5

AD-A

1000000





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

AD A109990

ARCTIC ICE DYNAMICS JOINT EXPERIMENT 1975-1976
PHYSICAL OCEANOGRAPHY DATA REPORT
PROFILING CURRENT METER DATA -- CAMP SNOWBIRD

Volume 3

prepared by

T.O. Manley, Kenneth Hunkins, Werner Tiemann

CU-6-80, Technical Report No. 6

Department of the Navy
Office of Naval Research
Contract N00014-76-C-0004
Publication Support: NSF DPP-80-25211

Approved for public release, distribution unlimited

February, 1980

Lamont-Doherty Geological Observatory of Columbia University
New York, N.Y.

TABLE OF CONTENTS

	<u>Page</u>
TABLE OF CONTENTS	ii
ABSTRACT	iii
LIST OF FIGURES	v
LIST OF TABLES	vii
INTRODUCTION	1
PCM RELIABILITY	11
INITIAL DATA REDUCTION	14
COMPUTER REDUCTION	16
INTERPOLATED POSITION AND ICE VELOCITY	25
ERROR ESTIMATES FOR INTERPOLATED POSITION AND ICE VELOCITY	27
OUTPUT FORMAT OF FINAL DATA	39
FEATURES OBSERVED IN THE PROFILING CURRENT METER DATA	42
1. THE EKMAN LAYER	42
2. SUBSURFACE EDDIES	45
3. WIND-DRIVEN CURRENTS	49
ACKNOWLEDGEMENTS	54
APPENDIX 1	55
APPENDIX 2	56
APPENDIX 3	62
REFERENCES	64
RESULTS	66
PCM STATION LISTINGS	67

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution _____	
Availability _____	
Dist	

ii

A



ABSTRACT

ARCTIC ICE DYNAMICS JOINT EXPERIMENT 1975-1976
PHYSICAL OCEANOGRAPHY DATA REPORT
PROFILING CURRENT METER DATA - CAMP SNOWBIRD
VOLUME 3

by T.O. Manley, Kenneth Hunkins, and Werner Tiemann

The oceanographic program of the 1975-1976 ARCTIC ICE DYNAMIC JOINT EXPERIMENT (AIDJEX) was designed to investigate the Arctic Ocean on space scales of 100 kilometers in the horizontal and hundreds of meters in the vertical. This was accomplished with oceanographic observations from a triangular array of three smaller manned satellite camps with a centrally located larger main camp. The radio call signs of the satellite camps were Caribou, Blue Fox, and Snowbird, the main camp being designated Big Bear.

Profiles of relative current speed and direction were measured twice each day between the surface and 200 meters at each of the four camps. A profiling current meter (PCM) with speed, direction and depth sensors was lowered and retrieved with a multi-conductor cable at a slow rate of 5 meters per minute. Sensor signals were transmitted by cable to be recorded graphically and digitally at the surface. Digital recording of the data at a slow rate of 1 scan per half minute along with a low signal-to-noise ratio made it preferable to manually digitize the analog charts to preserve as much information as possible.

The final data set consisting of absolute velocity profiles of speed and direction was obtained by the vector addition of the relative PCM profiles with the interpolated ice velocity based on precise satellite navigation at the time of the observation. Data reduction problems included a hysteresis effect between up and down traces due to cable angle, directional spikes resulting from a rapid sensor package rotation, and spurious results when low velocities are added vectorially.

Relative speed between the ice and water in the upper mixed layer is often small indicating that this layer closely follows the ice motion. Persistent large clockwise shears in relative current direction occur sometimes in the mixed layer, attaining up to 540 degrees of rotation. These are best seen in the relative velocity data. Upon the addition of the ice velocity vector, to produce absolute velocities, the smooth relative directional shear of the Ekman spiral then exhibits local shears and speed minimums. This is due to the directions and speeds in the spiral being opposite or nearly opposite to the ice velocity vector and of comparable magnitude.

One of the most striking features of the current profiles is the appearance from time to time of swift currents below the mixed layer with speeds attaining 60 cm/sec. The depth of maximum velocity ranges from 80 to 190 meters. Although evidence of swift transient undercurrents had been observed in the Arctic Ocean as early as 1937, it was not until 1974 that these currents were shown to be associated with mesoscale eddies.

This data report deals only with the absolute velocity data obtained from the profiling current meter at Camp Snowbird. PCM data for camps Caribou, Blue Fox and Big Bear are in separate volumes (Manley et al., 1980). Data reports pertaining to the salinity-temperature-depth (STD) data taken at the manned AIDJEX camps are also in separate volumes (Bauer et al., 1980).

LIST OF FIGURES

	<u>Page</u>
1. Beginning and ending positions of the four manned camps.	2
2. Detailed drift track of camp Caribou	3
3. Detailed drift track of camp Blue Fox	4
4. Detailed drift track of camp Snowbird	5
5. Detailed drift track of camp Big Bear	6
6. Speed calibration segment and corresponding linear regression - camp Big Bear	13
7. Flow diagram of processing scheme	17
8. Profile with sensor-induced 360° rotation	20
9. Profile of Figure 8 after visual editing	20
10. Example of summer inertial oscillations	28
11. Example of winter segment with very low amplitude inertial oscillations	29
12. Raw error data for latitude - camp Blue Fox	32
13. Raw error data for longitude - camp Blue Fox	32
14. Raw error data for north ice velocity - camp Blue Fox	33
15. Raw error data for east ice velocity - camp Blue Fox	33
16. 95% confidence limit curve for Figure 12	34
17. 95% confidence limit curve for Figure 13	34
18. 95% confidence limit curve for Figure 14	35
19. 95% confidence limit curve for Figure 15	35
20. Blue Fox summer error curves for latitude, showing relative importance of time ratio and time difference	37
21. Comparison of an Ekman Spiral in both the relative and absolute velocity data	44
22. Eddy observed at camp Caribou - station 96	47
23. Eddy observed at camp Blue Fox - station 51	47

LIST OF FIGURES

		<u>Page</u>
24.	Eddy observed at camp Snowbird - station 49	48
25.	Eddy observed at camp Big Bear - station 154	48
26.	PCM data at camp Caribou through time at pre-selected depths of 50, 100, 150 and 175 meters	50
27.	PCM data at camp Blue Fox through time at pre-selected depths of 50, 100, 150 and 175 meters	51
28.	PCM data at camp Snowbird through time at pre-selected depths of 50, 100, 150 and 175 meters	52
29	PCM data at camp Big Bear through time at pre-selected depths of 50, 100, 150 and 175 meters	53

LIST OF TABLES

		<u>Page</u>
1.	Breakdown of PCM stations taken at each camp along with starting and ending dates	7
2.	Hydro-hole thicknesses at each of the manned camps	23
3.	List of meanings for the terms used in the "RESULTS" section	41

INTRODUCTION

The objective of the AIDJEX oceanographic program was to monitor velocity and mass fields in the upper levels of the Arctic Ocean from the four manned camps in order to provide an understanding of the interaction between ice and water.

The initial deployment of the manned camps began in March of 1975 with the establishment of the main camp, Big Bear. The satellite camps were then established during the next month and a half. The scientific program at each camp began as soon after its establishment as possible. Inclusive dates for the beginning and ending of the profiling current meter work done at each camp is listed in Table 1. Big Bear broke up in early October of 1975 and its scientific and logistic functions were transferred to the satellite camp Caribou. All of the other camps remained in operation until the closing, according to schedule, in May 1976. Figure 1 shows the position of the camps during the initial deployment in March of 1975.

The drift tracks that each camp made during the duration of the experiment are shown in Figures 2 through 5. A thumbnail sketch locates the plotted region with respect to the Alaskan and Canadian coasts. The asterisks indicate the positions at integral multiples of 20 days. The beginning and ending days are noted for each trajectory. A dashed line indicates a period of missing data. The region is 500 kilometers by 500 kilometers aligned with the x-y coordinate system shown in Appendix 1. Figures 2-5 were taken from Thorndike and Cheung, 1977.

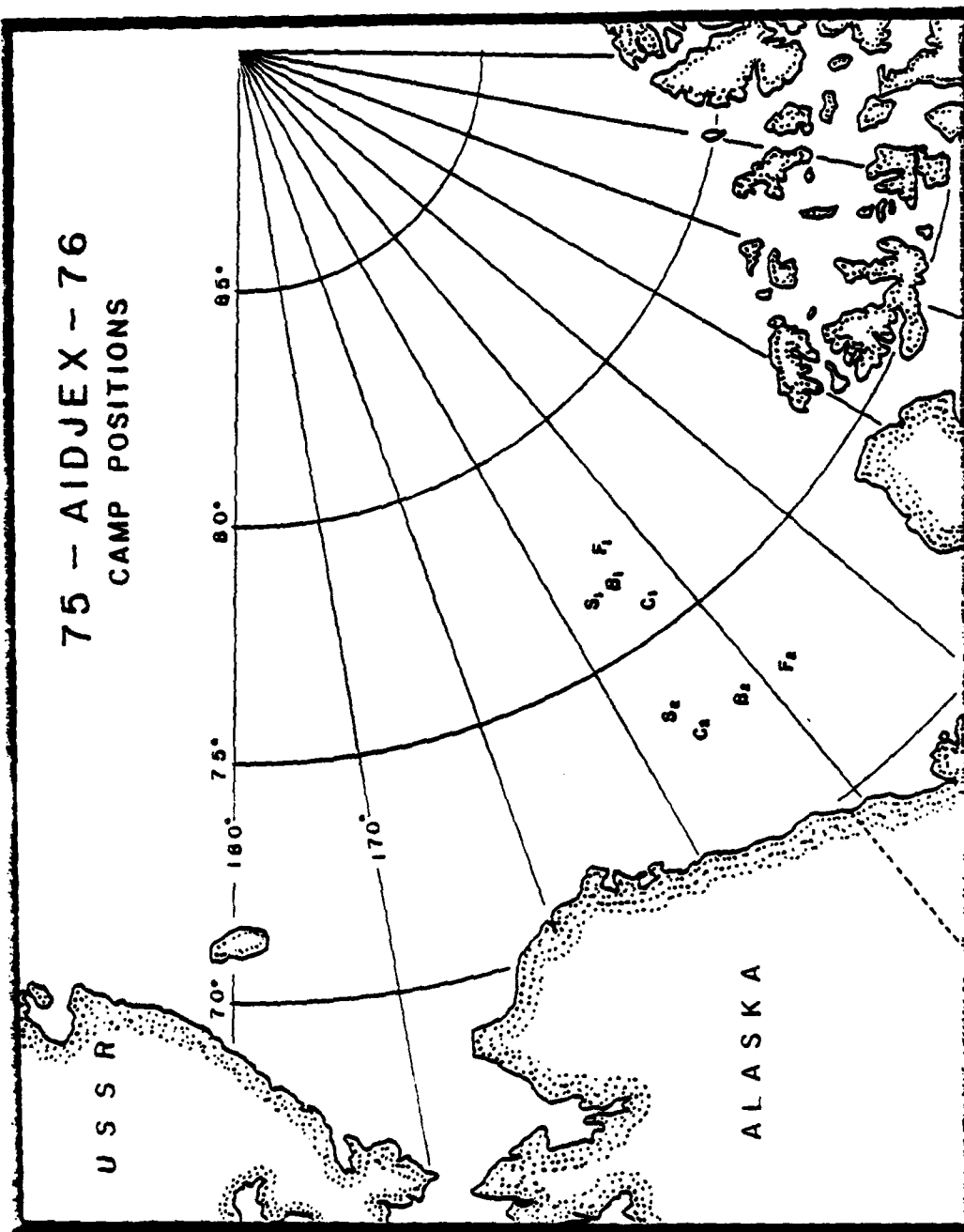


Figure 1. Beginning and ending positions of the four manned AIDJEX camps Caribou (C), Blue Fox (F), Snowbird (S) and Big Bear. Subscripts of 1 indicate the beginning positions. A subscript of 2 indicates the final position of the camp.

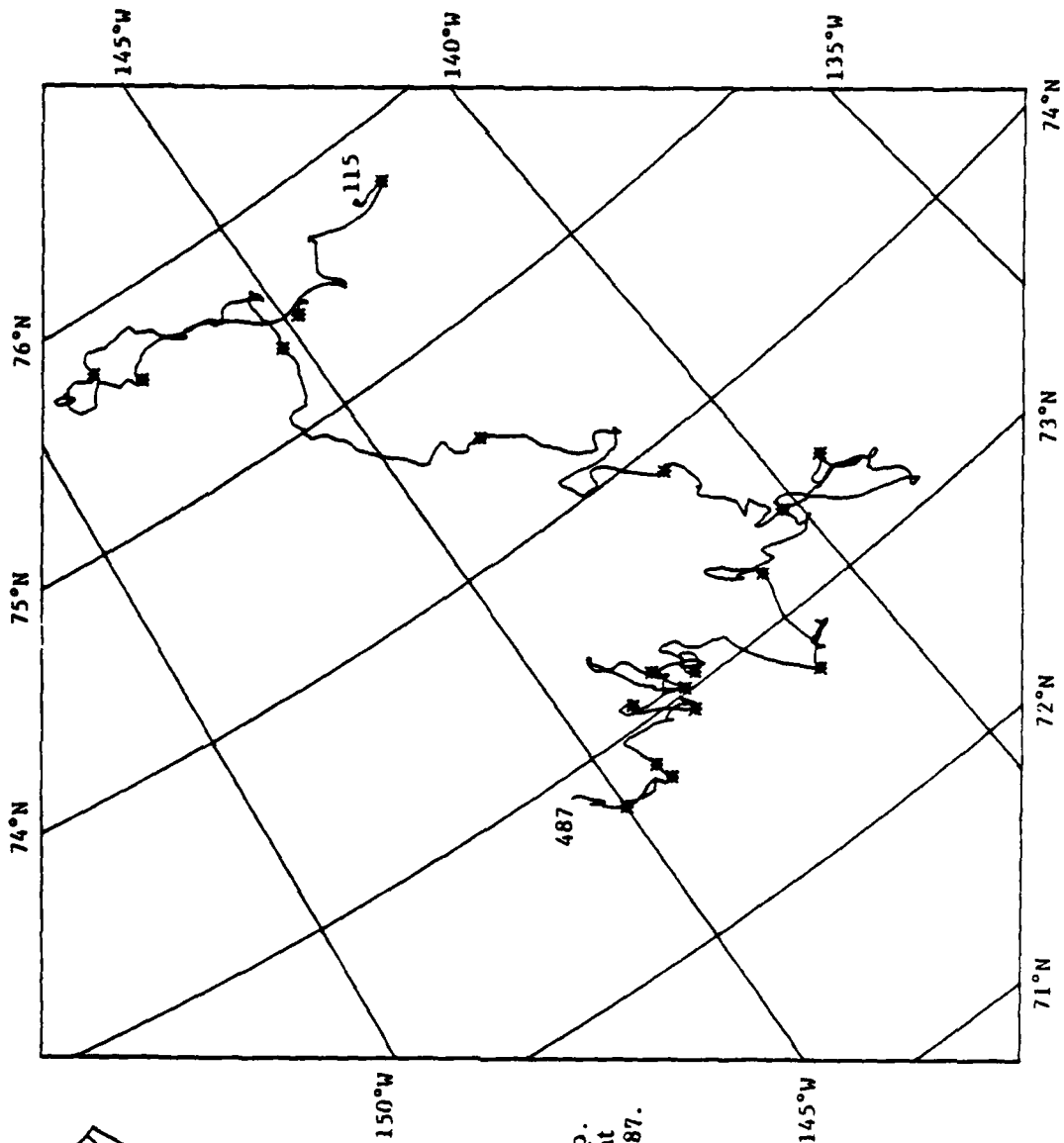


Figure 2.

Camp Caribou

Became the main camp
after Big Bear broke up.
Measurements by NavSat
from day 115 through 487.

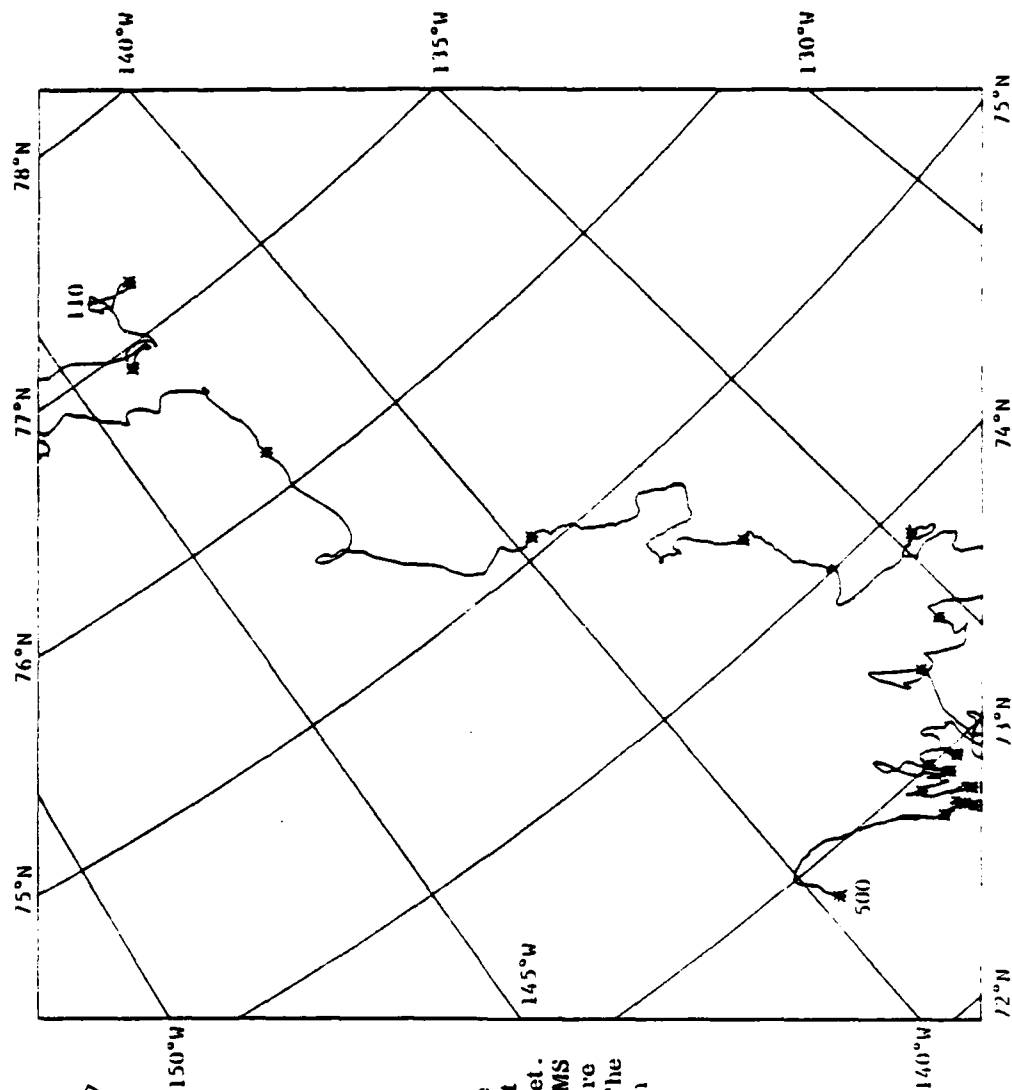


Figure 3.

Camp Blue Fox

Measurements by NavSat from day 110 through 489 with a gap from 203 to 208. Celestial position fixes were made during that period but were not used in the data set. After day 490 data from RAMS buoy R 772 were used. There is a gap from 531 to 573. The buoy was last heard from on day 579.

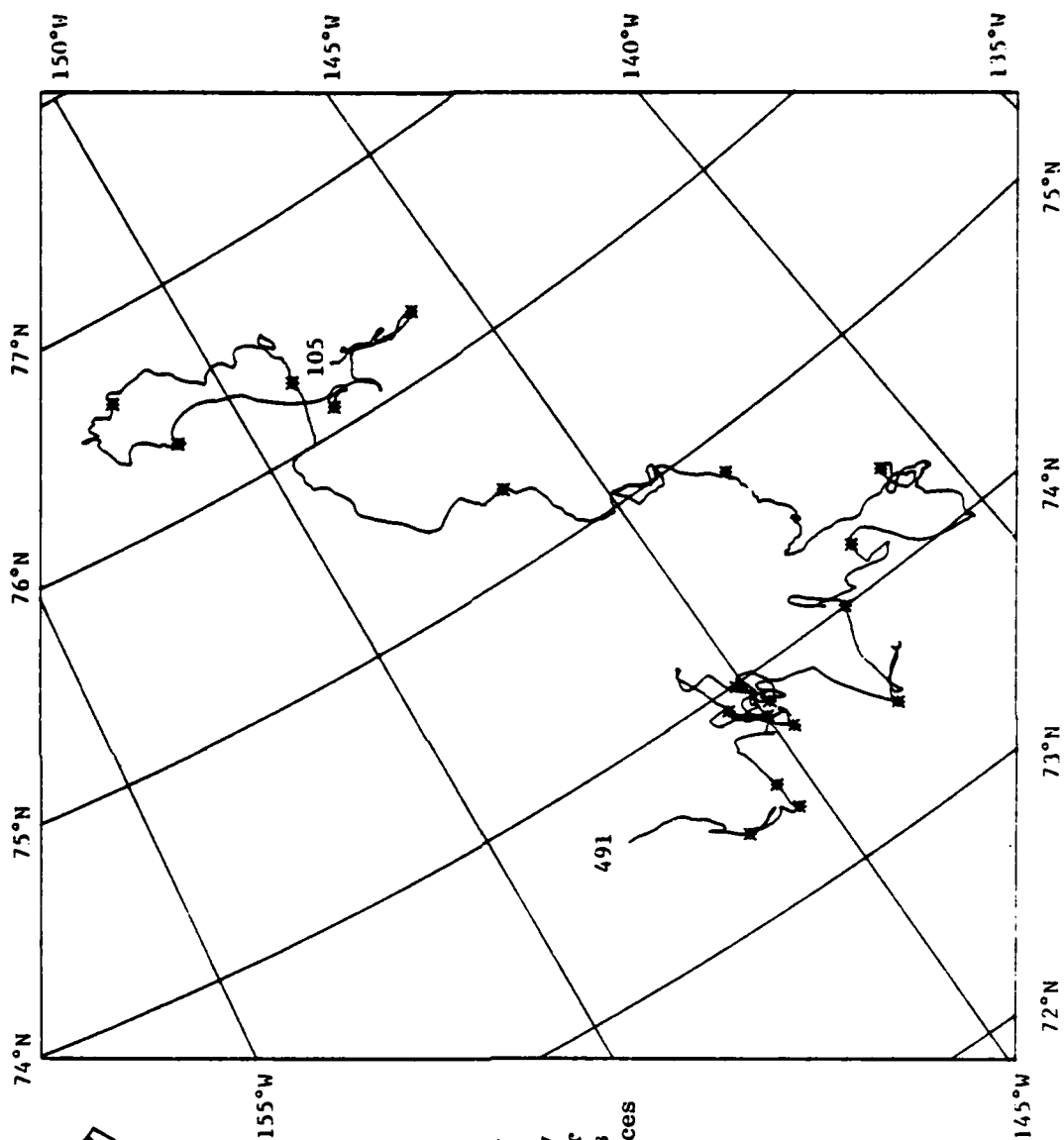


Figure 4.

Camp Snowbird

Measurements by NavSat
from 105 through 491.

This station was split by
cracks during the winter
and the NavSat antennas
were moved short distances
several times.

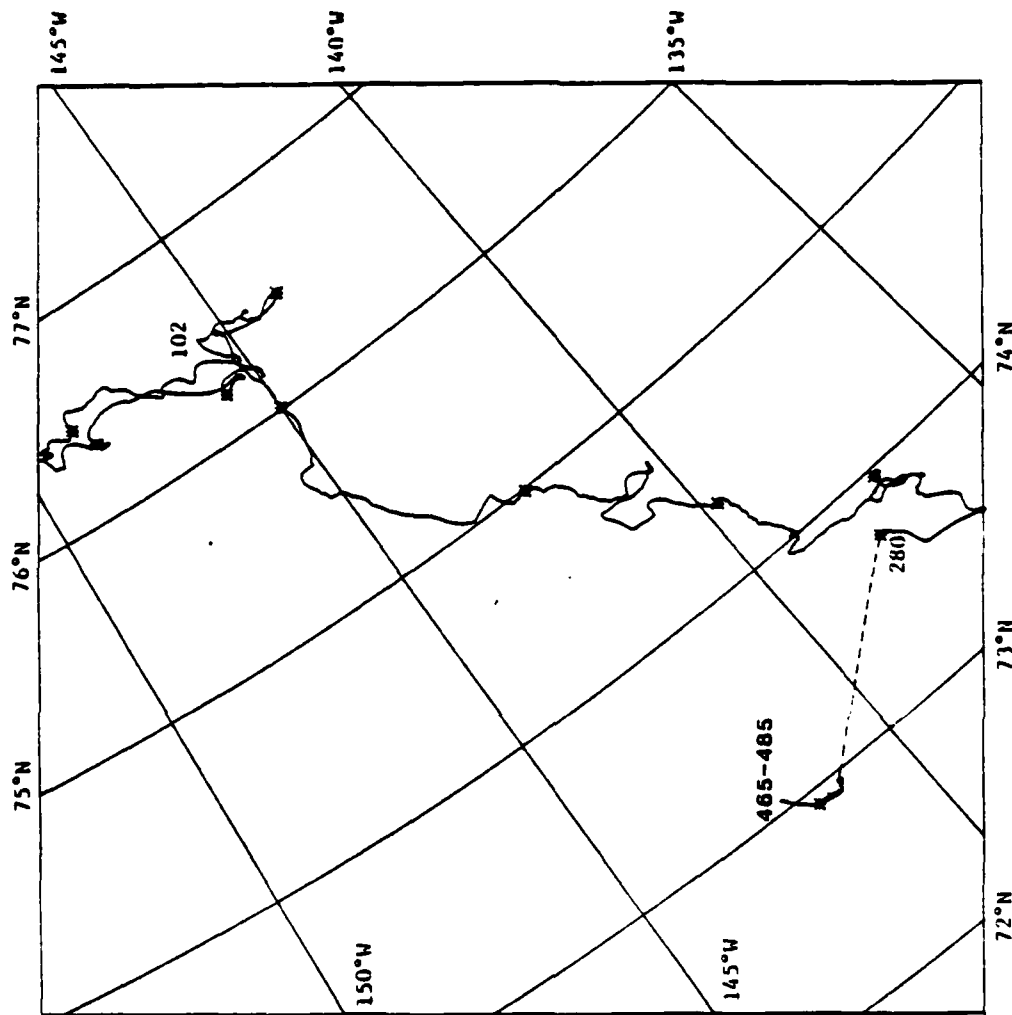


Figure 5.

Camp Big Bear

Measurements were made by NavSat beginning on day 102. On day 274 the camp was broken up by ice activity and eventually abandoned, the last data being on day 280. For a brief period in the Spring of 1976 the station was reoccupied and position measurements were made using RAMS buoy R 604, days 465-485. By this time the old camp had been spread over several kilometers.

TABLE 1

Breakdown of Profiling Current Meter Stations for Individual Camps

<u>Camp</u>	<u>Occupation Date</u>	<u>Evacuation Date</u>	<u>Total Stations Taken</u>	<u>Profiling Stations</u>	<u>Time Series Stations</u>	<u>Stations Digitized</u>
Caribou	6-Apr-75	7-May-76	404	395	9	163
	(5-Aug-75)	(22-Apr-76)				
Blue Fox	5-Apr-75	4-May-76	700	698	2	376
	(8-May-75)	(20-Apr-76)				
Snowbird	4-Apr-75	6-May-76	620	603	17	377
	(4-May-75)	(20-Apr-76)				
Big Bear	13-Mar-75	8-Oct-75	425	397	28	258
	(8-Apr-75)	(1-Oct-75)				

Note: 1) Parenthetical dates are those when PCM data collection began and ended.

2) "Stations digitized" indicate stations that had sustained speeds greater than a few cm/sec and were manually digitized for computer reduction.

The largest horizontal scale sampled by the PCM observations was the nominal 100 kilometer spacing of the manned camps, the smallest was the distance between successive casts at one camp. The maximum vertical scale sample was limited by the 200 meter depth of the profiling current meter casts. The smallest vertical scale sampled was about 10 meters and was determined by the response rate of the instrument and its rate of ascent and descent.

The AIDJEX oceanographic program maintained fixed-mast current meters of uniform type (Hydro Products) at all camps at shallow depths in the planetary boundary layer. The fixed-mast current meters at each camp were suspended on a series of rigid 3 meter, 7.5 cm diameter, PVC sections at depths of 2 and 30 meters below the base of the ice. Hourly averages pertaining to the fixed-mast current meters can be obtained through the National Oceanographic Data Center.

The directional sensors of the fixed-mast current meters were referenced to the instrument case and therefore had to be referenced to the camp azimuth to provide directions relative to true north. This was accomplished by accurately drilling the coupling holes at the ends of the PVC pipe by a lathe. When the current meter was suspended at its correct depth, the top drill hole of the pipe was then aligned to a fixed point in the camp area. A simple correction angle could then be applied to the fixed-mast data relating their direction to the camp azimuth.

Profiling instrumentation consisted of a Tsurumi-Seiki Co., Ltd. (TSK) underwater unit with a Savonius rotor, directional vane and pressure sensor. The unit was raised and lowered at 5 meters per minute by an electric

winch. The rate was chosen after several experiments to determine rotor response with different axial velocities. Current direction in this instrument was referenced to an internal magnetic compass. The direction vane follower and compass were both operated on the "light encoding disk" principle and were therefore not subject to unnecessary drag caused by the usual wiper arm friction. Low bearing friction and viscosity of the fluid surrounding the compass were the only components of drag on the directional system. This is an important factor since the horizontal component of the earth's magnetic field is so weak at these high latitudes.

Data from the PCM were simultaneously recorded on an analog chart recorder with speed, direction and depth versus time and on the AIDJEX digital data logging system (DDL). The data pertaining to the fixed-mast current meters were also recorded on the AIDJEX DDL system as well as on a multipoint recorder. The scan rate of the DDL (30 seconds) was acceptable for sensors obtaining long time series such as the fixed-mast current meters, but was not fast enough for the rapidly changing signals of the PCM.

Magnetic declination was measured one or more times each day at all the camps. These measurements were calculated by a relationship between the true and magnetic bearings of the camp azimuth. The camp azimuth was defined as an imaginary directed line passing through the A and B antennas of the satellite navigation system. The bearing of the camp azimuth, as related to true north, was determined by sun shots taken by the meteorologists. The magnetic bearing was obtained using an accurate surveyors compass placed directly in line with the camp azimuth. Magnetic declinations taken in this manner were good to plus or minus one-half a degree.

A total of 2084 PCM stations were obtained at the four camps over the yearlong duration of the program, each station consisting of an uptrace and downtrace. Of these, 1174 stations were useable. Stations that were not acceptable had relative currents that were below the threshold velocity of the instrument (approximately 5 cm/sec). Table 1 shows the breakdown of the total stations at each of the camps with those used in the final data reports. A listing of all the stations taken at the camp along with other associated parameters (dates, position, ...) is reported under the section "PCM STATION LISTING."

PCM RELIABILITY

Generally, all of the stations that have been processed show good coherence between the uptrace and downtrace of the relative velocity profiles on the scale of 10 meters or more. In many cases, the short wavelength structures can be followed from one station to the next. No spectral studies have, as of yet, been completed on the data to statistically confirm these observations. It appears, however, that repeatability of the data is very good on the scale of 20 meters and greater.

Similarity of directional tracking between the down and uptraces was rather good provided that the current speed was greater than 5 cm/sec. As the speed increased, the tracking of direction became very uniform as can be seen during any of the stations where rapid currents or eddies were observed. Below the velocity of 5 cm/sec, the directional vane oscillates widely and the coherence between traces falls off rapidly.

The one major problem associated with the PCM at all of the camps was the sluggishness of the Savonius rotor when compared with the Savonius rotors of the higher quality Hydro Products fixed-mast meters. We feel that this problem, since it was observed at all of the camps, was inherent in the design of the rotor system itself and was most likely due to bearing drag. Because of this problem of velocity data being less than suggested manufacturers' limits, great care was taken from the beginning to calibrate the PCM velocity readings at every station against the more accurate velocity readings of the 30 meter fixed-mast sensor. Experience from a number of investigators has shown that Savonius rotors with free bearings and uniform manufacture do

not need individual tank testing. A universal calibration curve may be used as was done for the Hydro Products meters. The Hydro Products Savonius rotor units had exceptionally good bearings and were used for calibration. The velocity of the 30 meter fixed-mast sensor and the velocity reading of the PCM were recorded at the instant that the two sensors were at the same depth level during each cast.

Calibration of the PCM velocity sensor was accomplished by linear regression between the PCM and 30 meter velocity readings over fairly large blocks of time (10 to 20 days). The blocks were separated into up and down-traces due to the presence of a hysteresis effect caused by the raising and lowering of the PCM through a current. In effect, a higher velocity would be recorded at any one level on the uptrace because of the sensor being pulled through the current. The opposite would be true for the downtrace. Large data blocks were used in the calibration procedure in order to (1) obtain enough data points over a wide range of speeds, and (2) average out random noise due to turbulence and/or human recording errors.

The mean coefficient of determination was calculated to be 0.87 with a standard deviation of 0.08. This indicates a high degree of correlation between the two Savonius rotors. Figure 6 shows a typical regression diagram used in the calibration of the speed sensor at camp Big Bear.

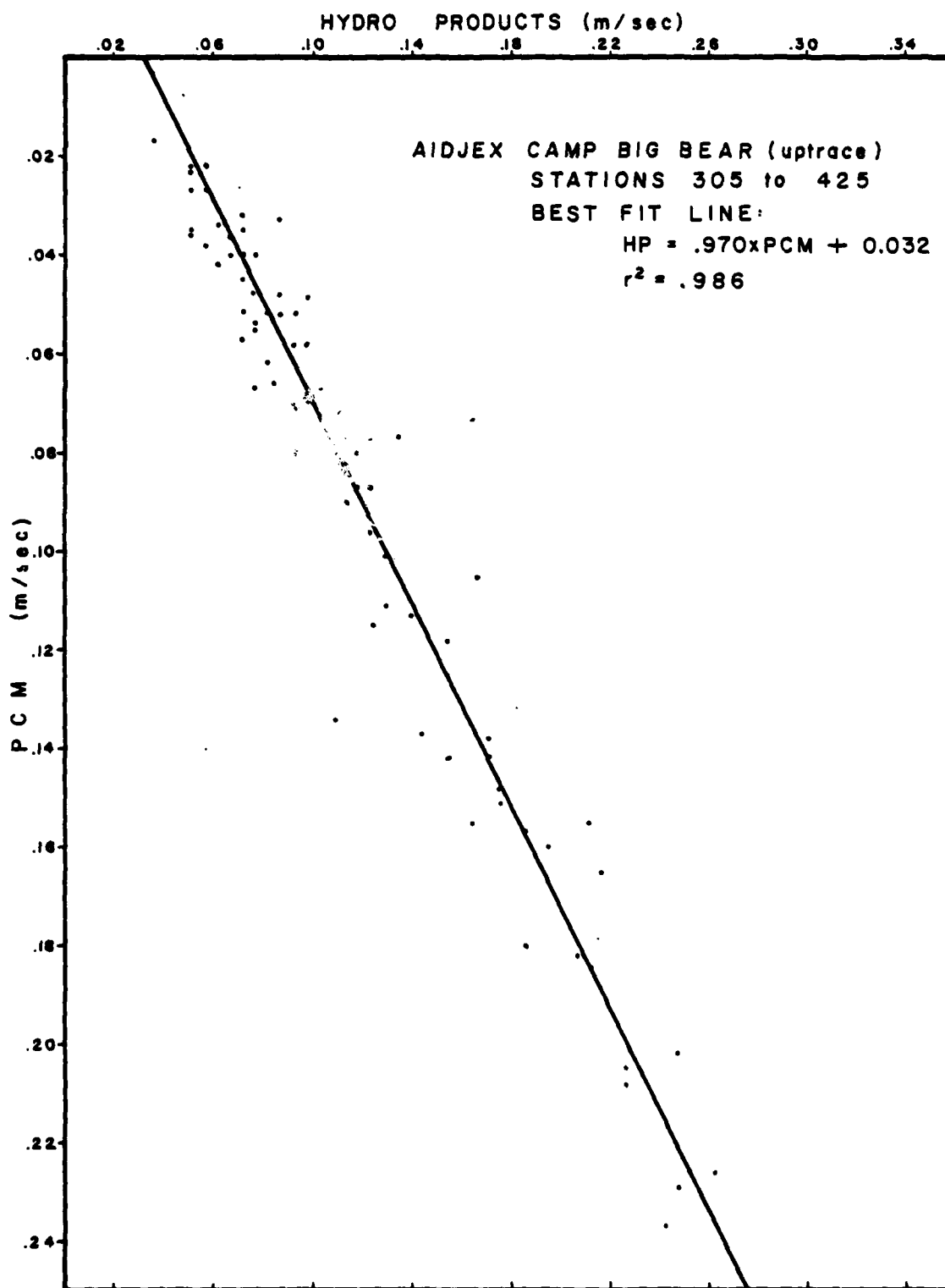


Figure 6. Linear regression diagram taken from a segment in the speed calibration from camp Big Bear.

INITIAL DATA REDUCTION

In addition to the calibration of the raw velocity data of the PCM, directional calibration, values for magnetic declination through time, and digitized card decks of the analog data had to be obtained before reduction could begin.

The PCM deck unit produced directional output from 0 to 540 degrees. This was designed to eliminate the rapid pen oscillations (zero to full scale) commonly seen on the 0 to 360 degree outputs when the directional vane oscillates around 0 degrees. There were only two instances when rapid pen movement was observed on the analog charts. The first being a shift from 0 degrees to 360 degrees and the second being a shift from 540 degrees to 180 degrees. On the basis of these exact shift points for 0 and 540 degrees, calibration segments throughout time were made that would correct direction for any linear drifts or sudden offsets. Linear drifting of the zero and full scale settings in time were not evident or did not account significantly for changes in the calibration data. As a result, bounds of the calibration segments were chosen because of sudden offsets in the data.

Magnetic declination data were originally taken once every day at each camp and then increased to once every time a profiling current meter station was taken. Readings obtained from a surveyor's compass aligned with the camp azimuth were combined with the camp azimuth determination closest in time to determine magnetic declination. The reduction of magnetic declination information was done so as to create blocks of data points that were separated by naturally occurring breaks caused by rapid ice movement. An average

magnetic declination was then computed for each data block representing a short span in time for each camp. In these data sets, very few points fell outside a span range of 3 degrees. Magnetic declination data obtained in this manner were accurate to within the plus or minus 6 degree accuracy limits for the PCM directional system. Final magnetic declination was then used to convert original PCM directional data (referenced to magnetic north) to true direction.

Finally, the analog chart records were digitized. Generally, each station consisted of a downtrace and uptrace unless one or the other had been rejected because of insufficient current or recorder problems. The points taken for digitization on each of the output traces for speed, direction and depth were the maxima, minima and inflection points, with enough points in between to preserve the proper curvature. Digitization provides some smoothing of the data. However, data with a scale length of greater than 2 meters were not affected.

The AIDJEX digital data logger tapes were not used for PCM data reduction due to a predesigned sampling rate of the computer that was too slow for the rate at which the PCM was lowered. Excessive noise along the data transmission lines also was a main factor in not attempting to reduce the tape data for the PCM.

Due to the convention adopted by the AIDJEX staff and other institutions responsible for the reduction of data taken during the main AIDJEX experiment, time was converted to a Julian calendar system with day 1 = 1 January 1975 and ending with day 500 = 4 May 1976. Throughout this data report, time in AIDJEX days is frequently cited. A list of the AIDJEX days versus the normal Gregorian system was tabulated in Appendix 3.

COMPUTER REDUCTION

Computer reduction involved quality control and calibration of the relative traces. The final product was absolute velocity consisting of speed and direction at one meter intervals to the maximum depth of the station. The flow diagram shown in Figure 7 indicates the sequence of operations used to produce the absolute data.

Once a large block of digitized data, consisting of up and down traces was completed, several quality control programs were run on the data. These programs checked for various mechanical and operator errors. After all problems were removed from the digitized decks, they were stored permanently in computer files.

Relative data were then produced for the individual up and down traces for all stations. Velocity and directional corrections were applied to the data to provide calibrated speed referenced to the Hydro Products 30 meter fixed-mast sensor and correction for directional offset and full scale parameters. Direction at this point in the processing was relative to true north by the addition of magnetic declination. The data set being produced consisted of individual traces with speed and direction at one meter intervals.

As reduction of the data proceeded, it became apparent that there were frequent, rapid 360 degree directional rotations and corresponding fluctuations in speed which were caused by the instrument (Figure 8). This feature appeared to be inconsistent with, or entirely absent from, the associated up or downtrace for a given station. Further investigation of this feature showed it to be an artifact induced into the analog records by a rapid

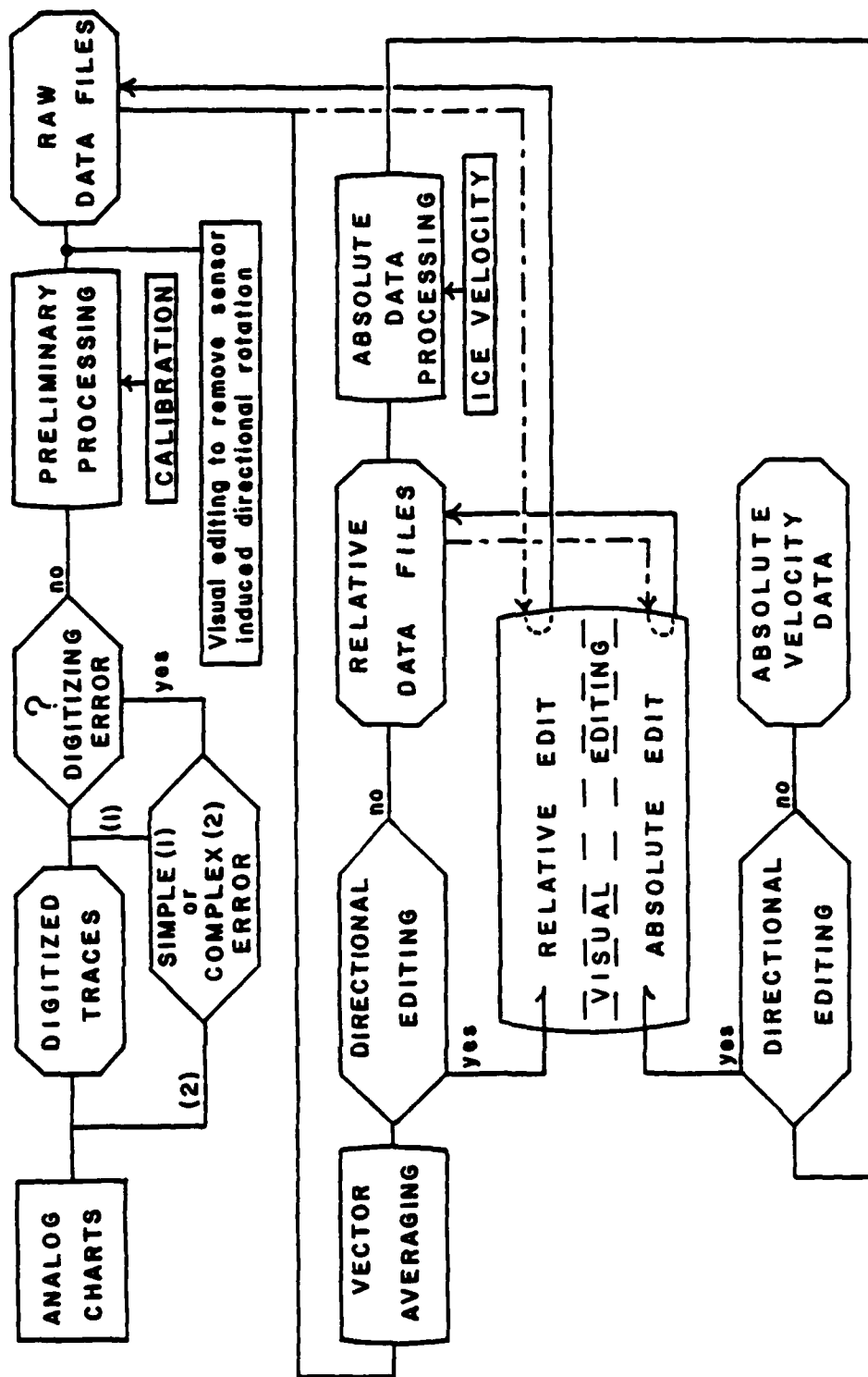


Figure 7. Flow diagram indicating the process by which absolute velocity data are obtained. Dashed line with arrow indicates the file necessary for editing. Solid line with arrow indicates where final edited data are returned.

spinning of the sensor package. The reason for the rotation of the sensor is believed to be a rapid untwisting of the stiff electrical cable after it had been slowly turned by hydrodynamic forces acting on the slight asymmetries of the instrument package.

Even though the direction system of the PCM was independent of the instrument package, the viscosity of the fluid surrounding the compass provided enough friction to partially rotate it along with the instrument housing.

Approximately 70 percent of the analog traces had been digitized by the time this feature had been recognized as an instrument-induced signal. Nearly half of these digitized traces were associated with one or more of the directional features. The remaining analog traces requiring digitization had the rapid directional rotation and associated speed fluctuation removed manually. This was accomplished by supplying a visual best fit curve to the valid data before and after the deleted segment.

Due to the large portion of digitized analog traces that included this rapid directional rotation, a visual editing program was created to remove them. The editing program graphically displayed any uptrace or downtrace found by the operator to contain one of these rotational features. The operator then chose the upper and lower depth limits of the feature that was to be deleted. A least squares best fit cubic equation was then calculated using three points preceding the upper depth limit and three points following the lower depth limit. In the special cases where the directional rotation began at the start of the trace or concluded at the end of the trace, so there was no leading or succeeding three points, an average of the three points present was used to

fill in the deleted section. Figures 8 and 9 show an example of the editing procedure of the program using a before and after profile of a station with one of the rotational features.

The uptrace and downtrace were combined, by vector averaging, to provide a single relative velocity profile. Speed and direction of the two traces were converted to north and east components. After the averaging of the individual components at one depth level, they were reconverted to speed and direction.

The hysteresis effect was effectively eliminated by the addition of the two traces. In several cases where only one trace existed for a station, the profile was not altered to remove the hysteresis.

Vector averaging was preferred over arithmetic averaging of the traces because of an added advantage during low speed addition. As previously mentioned, directional coherence falls off rapidly as the speed approaches the threshold velocity of the instrument. When combining the two traces, it was preferable that the greater velocity observed would have more weight in determining the final output at that depth level.

Vector averaging did possess its own inherent difficulties. The majority of these problems were confined to low velocity addition. When the traces to be added were significantly different in directions at the same depth level (due to low directional coherence at low speeds), erratic directional oscillations or rapid shifts in direction would result when the vectors from both traces would alternate dominance and thereby change the final output more to the direction of the dominant vector. These shifts would sometime attain a directional shear of 180 degrees per meter.

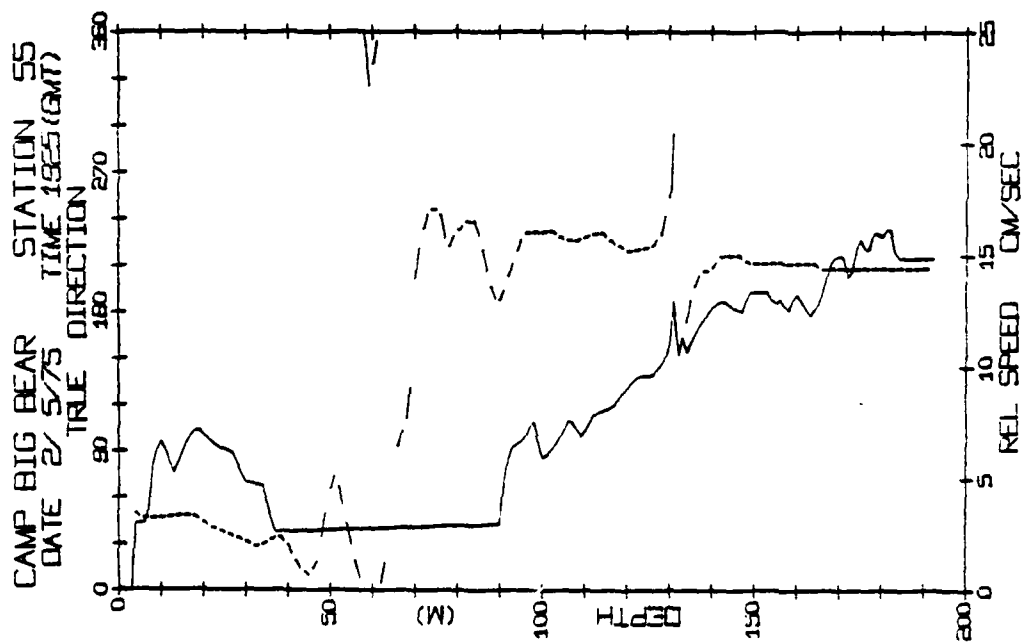


Figure 8. Typical example of a 360 degree directional rotation caused by the sensor package being spun. Seen at 130 m.

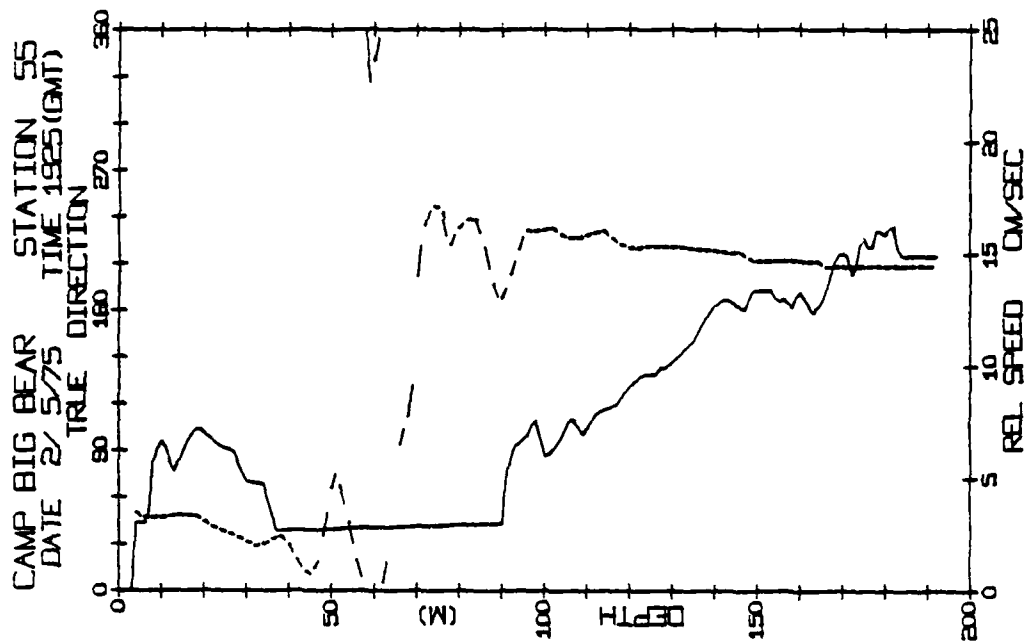


Figure 9. Same plot as Figure 8, but after being visually edited to remove 360° rotation.

The remainder of the cases providing the erratic directional output were due to a rapid increase in speed (within a few meters) resulting from the Savonius rotor attaining or passing its threshold velocity after being motionless for some period of time. As before, if directions were significantly different, an increase in speed would sometimes change dominance from one trace to another, thereby providing rapid directional shifts.

Both of these problems, for the most part, were removed without any major difficulty. This was accomplished by visually editing the section of the trace causing the erratic directional output. Editing was done in the same manner used to remove the sensor-induced rotational spikes. It should be noted that the editing of the traces was not designed to eliminate the sense of the rapid shift in direction, but rather to smooth the shift out to a more realistic rate of change of direction. In general, rapid directional shifts with a rate of change of direction less than 30 degrees per meter were left untouched. For consistency throughout the data set, only one person familiar with this particular problem was used in the editing process. It was felt that this provided as much continuity as possible in the decision making from station to station and from camp to camp. Several stations from a few of the camps were eliminated all together from the data set because necessary editing would have been too severe.

Before the editing of the relative data was to commence, an attempt was made to reduce the amount of visual editing by removing all relative speeds and their associated directions less than or equal to 5 cm/sec from the data set. This, however, turned out to be impractical because the total amount of relative data lost would have been on the order of 30%, as compared to the 1% - 2%

that was to be edited. Another problem was the loss in continuity of speed and direction in a profile every time a block of data less than 5cm/sec was removed.

Finally, absolute velocities were computed by vectorially adding ice velocities to the relative data.

Obtaining estimates for the position and ice velocity for a particular station is given in greater detail in the section entitled "Interpolated Position and Ice Velocity." Briefly, two cubic equations (related to latitude and longitude) are uniquely defined by the satellite navigation data sets directly preceding and following the point in time related to the station. Each satellite navigation set consists of the position (latitude and longitude), ice velocity (north and east components) and the time of observation. Introduction of the time of the station into the two cubic equations provides the latitude and longitude of the station. North and east ice velocities are calculated using the first time derivatives of the latitude and longitude equations respectively at the time of the station.

Estimates (95% confidence limit) of the errors associated with latitude, longitude, north and east ice velocities are also provided at the same time. If the error estimates were too severe, the station in question was then removed from the absolute data set.

Any data obtained while the sensor was in the hydro-hole were removed. Ice thickness at the hydro-holes is indicated in Table 2. The first data point to be kept as viable data was at the first integral depth value past the bottom depth of the hydro-hole. Any data reported in the hydro-hole

were given default values for speed and direction. The default values being 0.0 cm/sec and 999.9 degrees respectively.

TABLE 2

<u>Camp</u>	<u>Ice Depth Below Sea Level at Hydro-hole (cm)</u>
Caribou	300
Blue Fox	470
Snowbird	340
Big Bear	250

Vector addition still proved to be a problem in a small percentage of the total number of data points. This problem was very similar to the difficulties encountered during the low velocity vector averaging of the up and downtraces, the only difference being that this occurred when speeds of the relative data closely matched that of the added ice velocity vector. Generally, this happened when ice velocities were low; however, problems did still exist at speeds of 15 to 20 cm/sec. Even though the final result of the addition of the ice vector to the relative data for these special cases was very similar to the low velocity vector averaging problem, the physics of the situation was not the same. The reason for the majority of the problems was a result of the PCM being pulled through a nearly motionless part of the water column (absolute speed less than 5 cm/sec). The result being a relative speed profile of the negative of the ice velocity vector while the sensor was in that particular part of the water column. Upon the addition of the ice velocity vector

to the relative data, resultants are going to be very small and for the most part directions will have very high shears attaining 180 degrees per meter.

Consider the example where two relative velocity vectors separated by 1 meter in depth are being added to the ice velocity. Both vectors are nearly opposite to the ice vector, however one of the relative vectors is less than the speed of the ice and the other having a magnitude greater than that of the ice. The result of the addition would be two successive small amplitude absolute velocity vectors, each being out of phase with the other by approximately 180 degrees.

Visual editing of the relative data was again employed to remove the extreme directional shears from the absolute velocity profiles. There was, however, one major difference in the editing policy, since directional shears were generally larger than those seen in the averaging process and they were due to a different situation. This procedural difference was to ignore the directional shifts at low speeds and concern ourselves with trying to provide correct decisions at the higher velocity directional shifts that would maintain the integrity of the original analog profiles. As a result of this decision, there are several profiles still possessing the high directional shears at low absolute speeds. These directions are not to be taken as fact but rather should be put in proper perspective with the directions at more reliable speeds above and below the affected segment.

INTERPOLATED POSITION AND ICE VELOCITY

Filtered and smoothed estimates for position and velocity through time were recently updated for all of the AIDJEX 1975-76 manned camps (Thorndike and Manley, 1980) to provide better resolution for inertial oscillations of the ice motion. The initial Satellite Navigation report (Thorndike and Cheung, 1977) indicated signal reduction in the data at the inertial period due to filtering of approximately 50% and was therefore not acceptable for the reduction of certain parts of the oceanographic data set.

Positional estimates were not regularly spaced in time nor were they at the times when the STD or PCM stations were started. Therefore it was necessary that some software routine be constructed in order to give reliable estimates of the position and ice velocity at the times of the stations in question.

Normally, 25-30 position fixes were recorded per day at each of the four camps. The maximum number of fixes per day was close to sixty, and the minimum was zero for a period of approximately five days. With these wide variations in the spacing of the data, it became important to estimate the standard error associated with the calculated positions and velocities. These error estimates would then later become useful in the determination of the station's relative importance for a particular application. Typical examples would be the rejection of an STD station (position error of 1000 m) intended to be used in a geostrophic calculation where the inter-station spacing is on the order of 2 kilometers, or relative velocity PCM stations being rejected for absolute data processing when the ice velocity error was exceedingly high. Regardless of the intended application, error estimates for both position and velocity are an integral part of the data set.

There are several methods to determine the position of a given camp at a particular time, given precise estimates of the position and velocity before and after the time in question. The methods range from a simple approach of choosing the position fix closest in time to the station in question, to more involved interpolation schemes.

Due to the presence of small to intermediate scale structures observed in the AIDJEX oceanographic data set, precise position and ice velocity estimates were required to resolve them as best possible. By defining a smooth and continuous time dependent function $X(t)$, of a positional parameter such as latitude or longitude, four boundary conditions were initially provided by the navigation data set. These known conditions were: $X(t_1)$, $X(t_2)$, $X'(t_1)$ and $X'(t_2)$. In order for the function $X(t)$ to be uniquely defined, $X(t)$ by definition must be cubic.

Once the time of the station was provided, cubic equations for both latitude and longitude were defined using the navigation points directly before and after the station time in question. Position and ice velocity were then obtained by substituting the time of the station into the cubic equations and their first derivatives. North and east ice velocities being defined as the first time derivative of latitude and longitude respectively.

ERROR ESTIMATES FOR INTERPOLATED POSITION AND VELOCITY

Error estimates for the parameters of latitude, longitude, north and east ice velocities were broken into two time blocks consisting of summer and winter data. This was done to take into account the more uniform movement of the ice during the winter and the more variable movement in the summer due to the presence of more open water and higher amplitude inertial oscillations. The summer block consists of the data between 1 July 1975 (day 182) and 30 September 1975 (day 273). All data outside the summer segment comprised the winter block. The breaking points in time were chosen on the basis of the presence or lack of high amplitude inertial oscillations using the entire plotted data set of ice velocities (Thorndike and Cheung, 1977) of which Figures 10 and 11 are only a part. A major part of the summer data showing the increased presence of high amplitude inertial oscillations can be seen in part of Figure 10. In Figure 11, which comprises part of the winter data block, there is a marked damping of inertial oscillations, showing amplitudes less than a few cm/sec (days 409-422; 13-26 February 1976).

Errors were then calculated with the use of the Navigational data set. The general processing system would be to take three sets of points from the navigation data set, at times $T_1 < T_u < T_2$, each set containing latitude, longitude, north and east ice velocity and the time of observation, T_1 , T_u and T_2 defined as follows:

T_u = time of the "unknown"
 T_1 = time of first bounding data set
 T_2 = time of second bounding data set

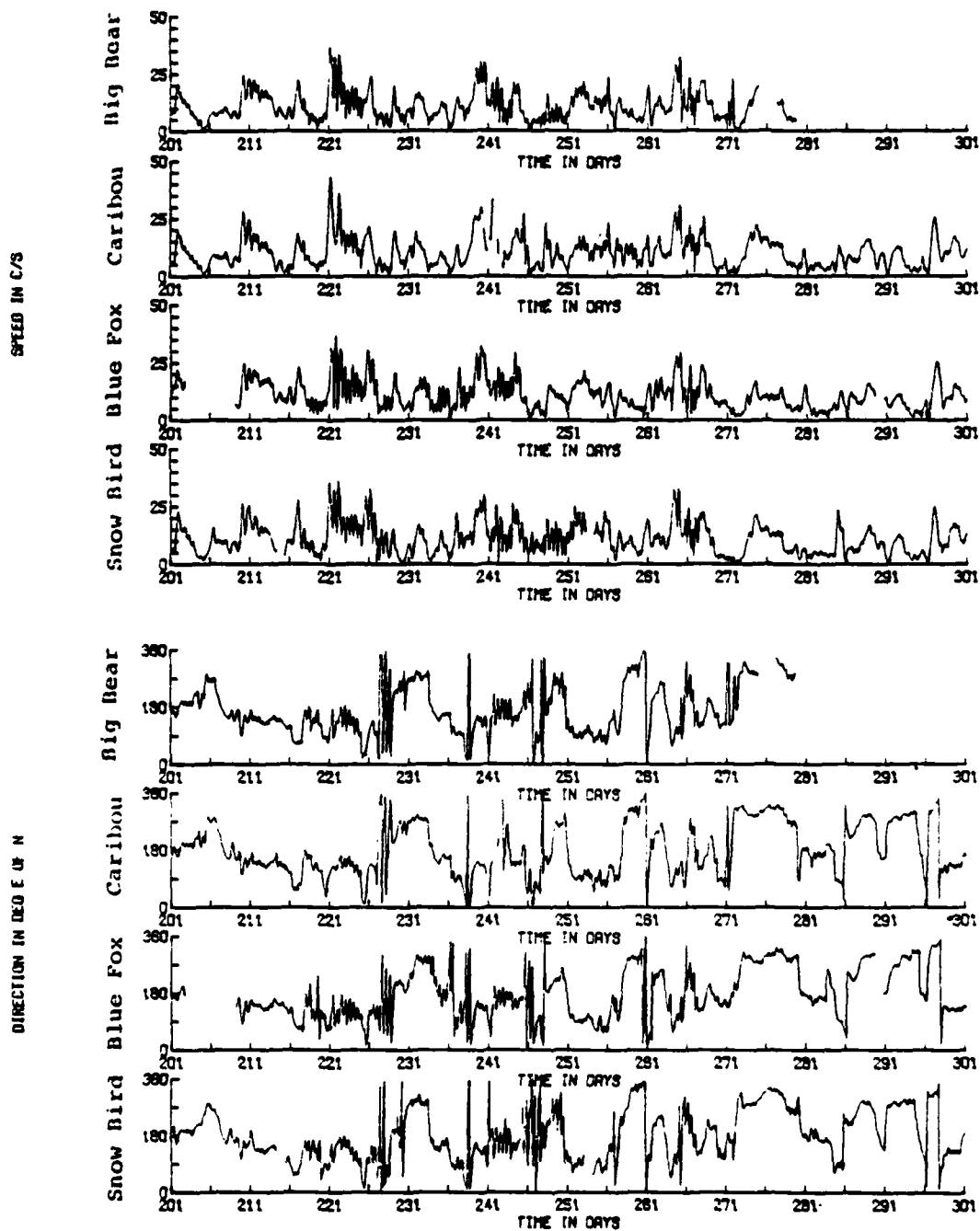


Figure 10. Speed and direction plotted for the manned AIDJEX camps, days 201 to 301.

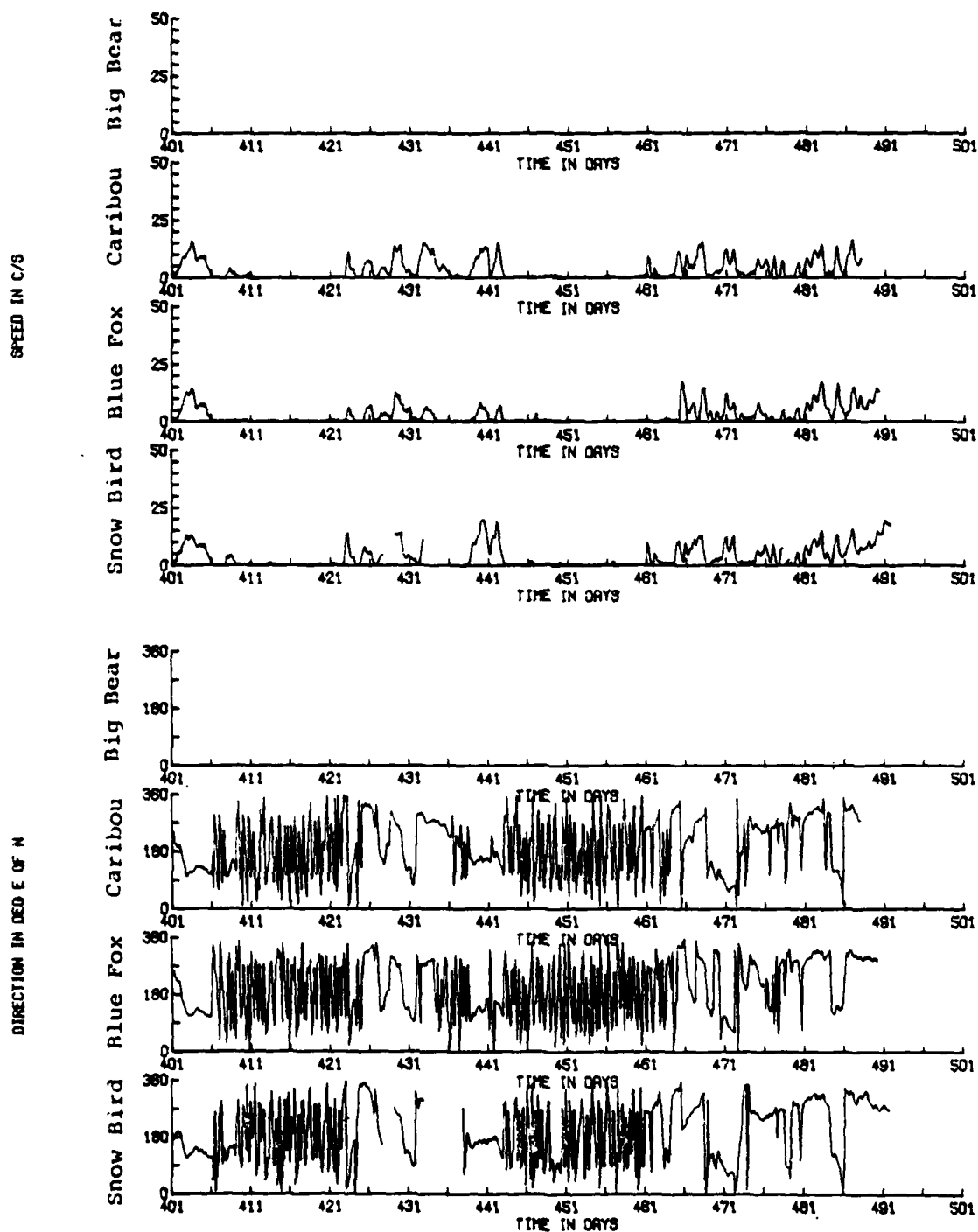


Figure 11. Speed and direction plotted for the manned AIDJEX camps, days 401 to 501.

The first and third sets of data define the boundary conditions upon which to formulate the cubic equations. The equations were then solved for the latitude, longitude, north and east velocity at the time of the second navigation set. Errors were then calculated by finding the absolute difference between the estimated (cubic) and known (navigational) parameters. The resulting errors for the four parameters were stored and statistically analyzed at a later time.

The errors were analyzed to determine their dependence on the times T_1 , T_u , and T_2 . If the bounding sets were separated by a relatively short span of time, regardless of where the "unknown" is within the time bounds, the errors for all four parameters are bound to be very small. On the other hand, if the bounding sets are separated by a large time span, then it becomes important to know where the "unknown" is located within the time bounds. As the time of the "unknown" approaches either of the bounding sets, errors are again going to be low. The same would be true for the reverse, i.e., as the "unknown" reaches a time point roughly in the center of the bounding sets, the errors should correspondingly get larger. Because of this, a time ratio was calculated and stored with the errors made for a particular point in time. The time ratio was defined to be the absolute difference in time between the first bounding set and the "unknown" divided by the time difference of the two bounding sets. This would be written as:

$$\text{Time Ratio} = R_t = (T_u - T_1)/(T_2 - T_1) \quad (1)$$

$$\text{Time Difference} = D_t = T_2 - T_1 \quad (2)$$

Roughly 1200 "unknowns" were computed for specified maximum time differences. The maximum time difference being the time difference between the bounding data sets. Maximum time differences were confined to specific limits, those being from 1-2 hours, 3-4 hours, 6-7 hours, 11-13 hours, 23-25 hours, and 47-49 hours. Each of these runs was computed for the summer as well as the winter block, thus making 12 runs total. Each run computed better than 4800 errors for the four parameters in question.

Data were then stored as to time ratio and plotted for each run and parameter as shown in Figures 12, 13, 14 and 15. These figures show the errors from the 11-13 hour run for the winter time block at camp Blue Fox, each figure being one of the error parameters.

A sliding t-distribution of 30 points (95% confidence limit) was run on each of the data sets to provide a statistical upper limit below which 95% of the original data would fall. A least squares best fit quartic equation was then computed for the 95% confidence limit points. The quartic equation was chosen because of its ability to fit the data more closely at the time ratios of 0.0 and 1.0. Quadratic and cubic equations would tend to provide excessive negative error approximations as the bounding ratios were approached. Figures 16, 17, 18 and 19 represent the 95% confidence limit points and corresponding best fit equation resulting from the original data sets shown in Figures 12-15.

It has already been estimated that the error estimate (Ee) is defined to be a function of two parameters as stated in equation 3.

$$Ee = F(Dt, Rt) \quad (3)$$

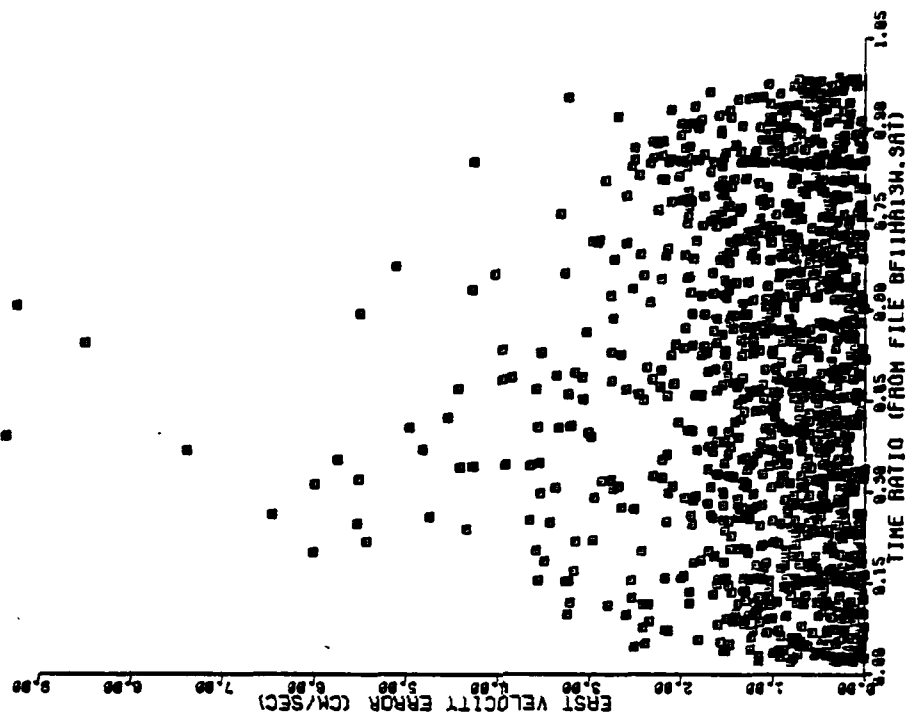


Figure 15. See text for more complete description.

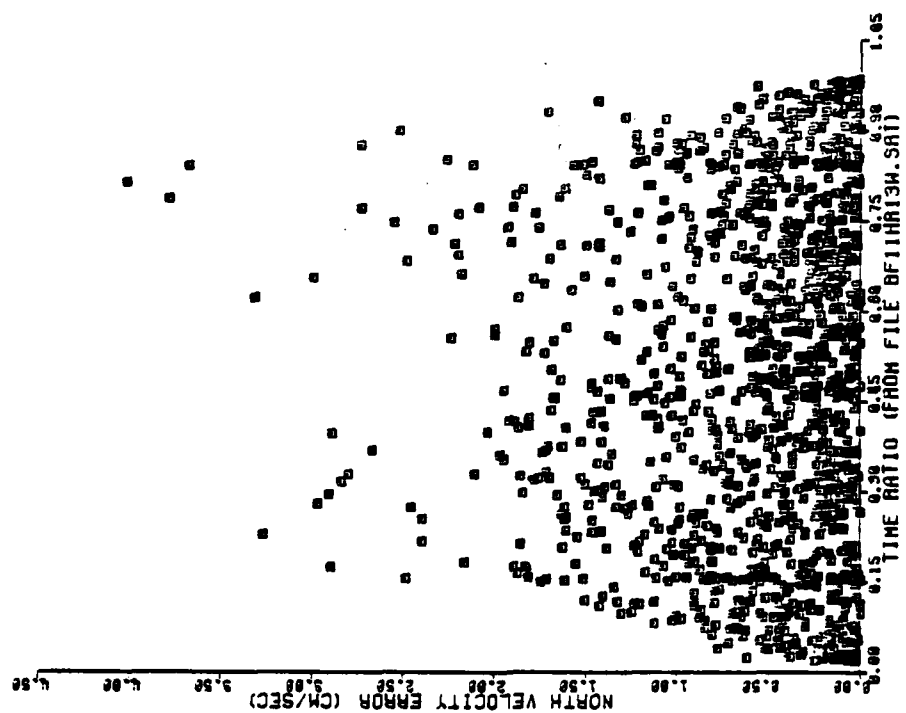


Figure 14. See text for more complete description.

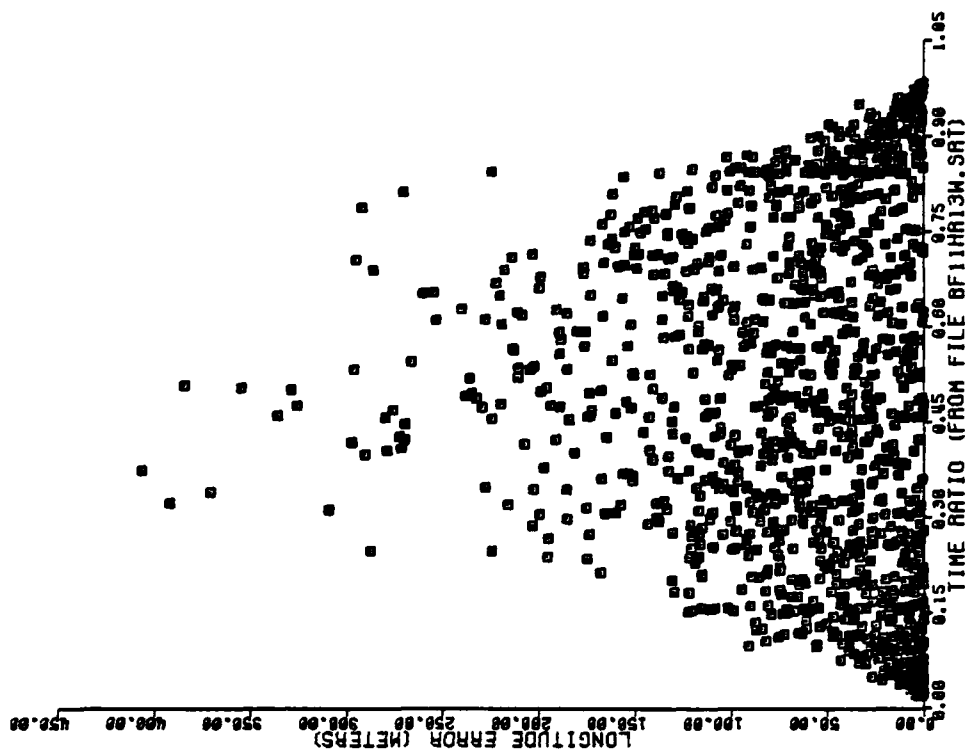


Figure 13. See text for more complete description.

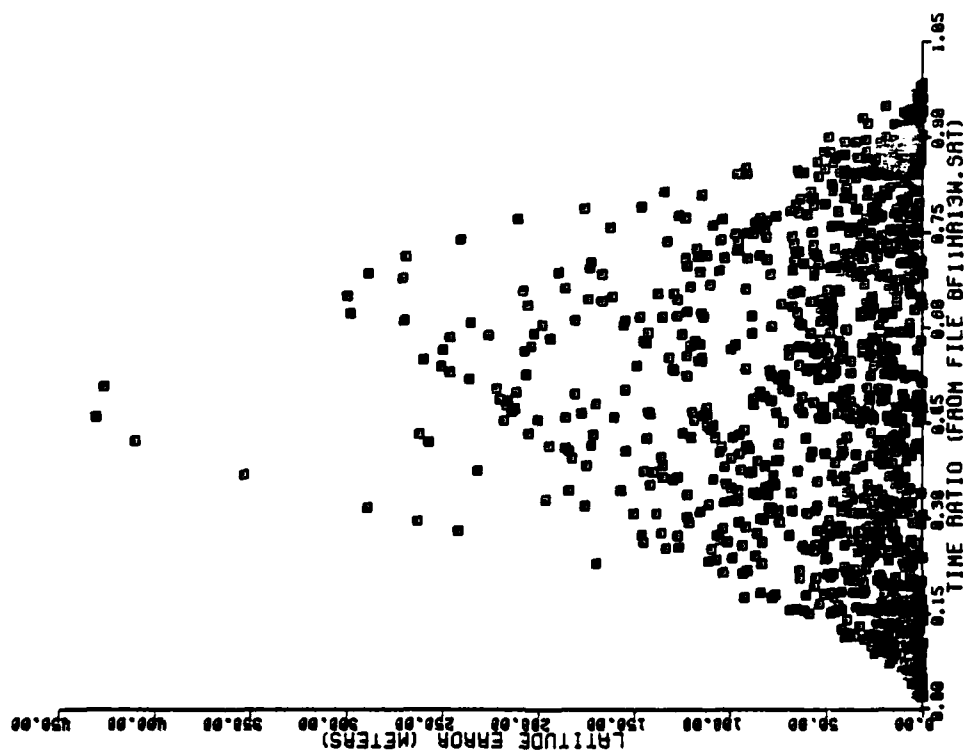


Figure 12. See text for more complete description.

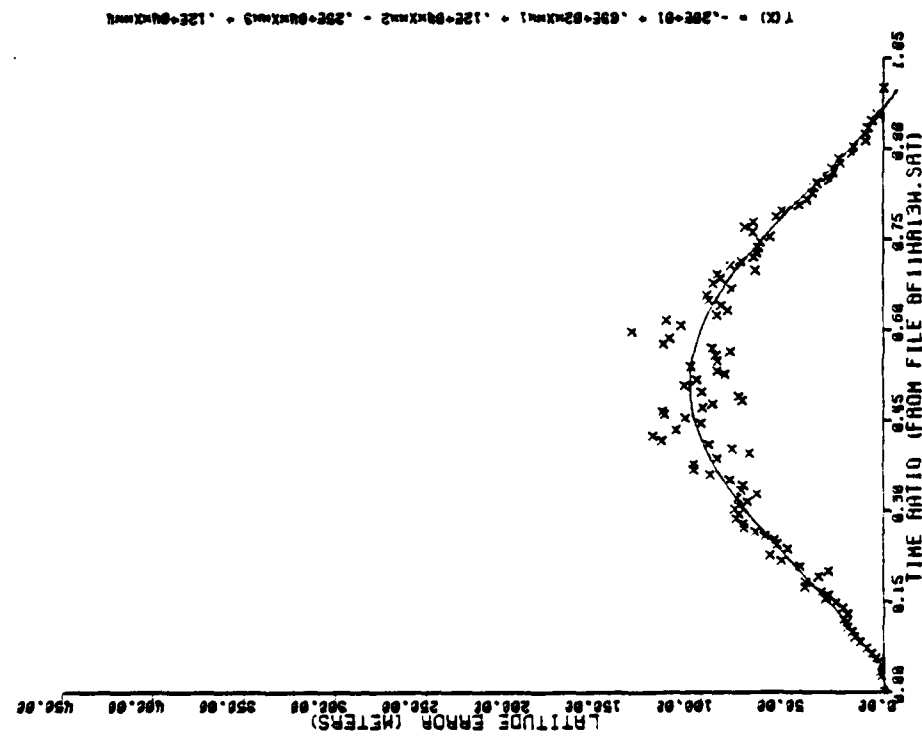


Figure 16. See text for more complete description.

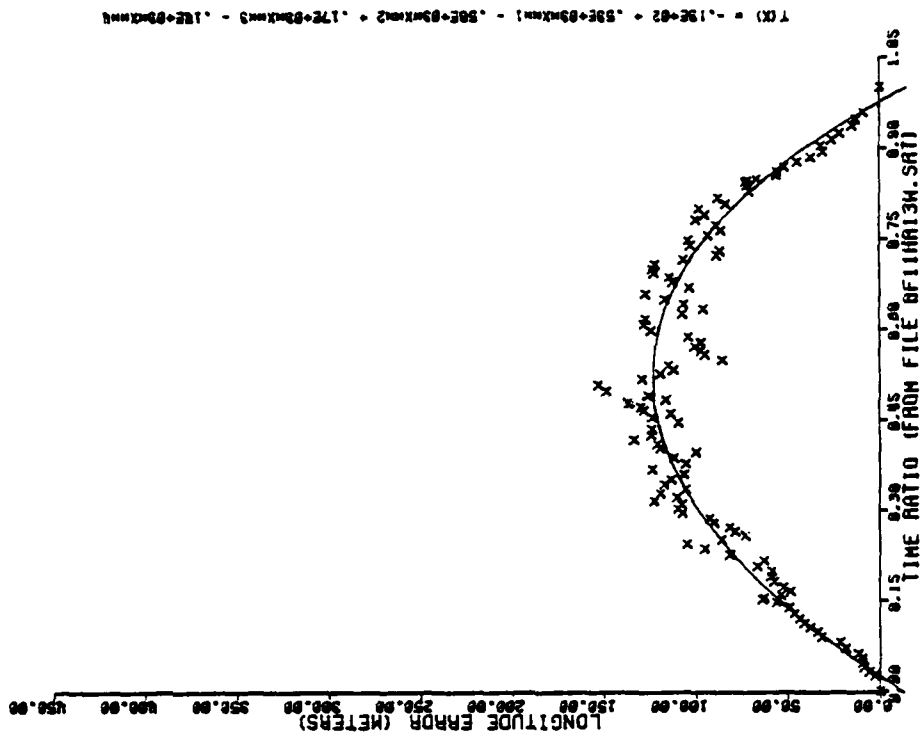


Figure 17. See text for more complete description.

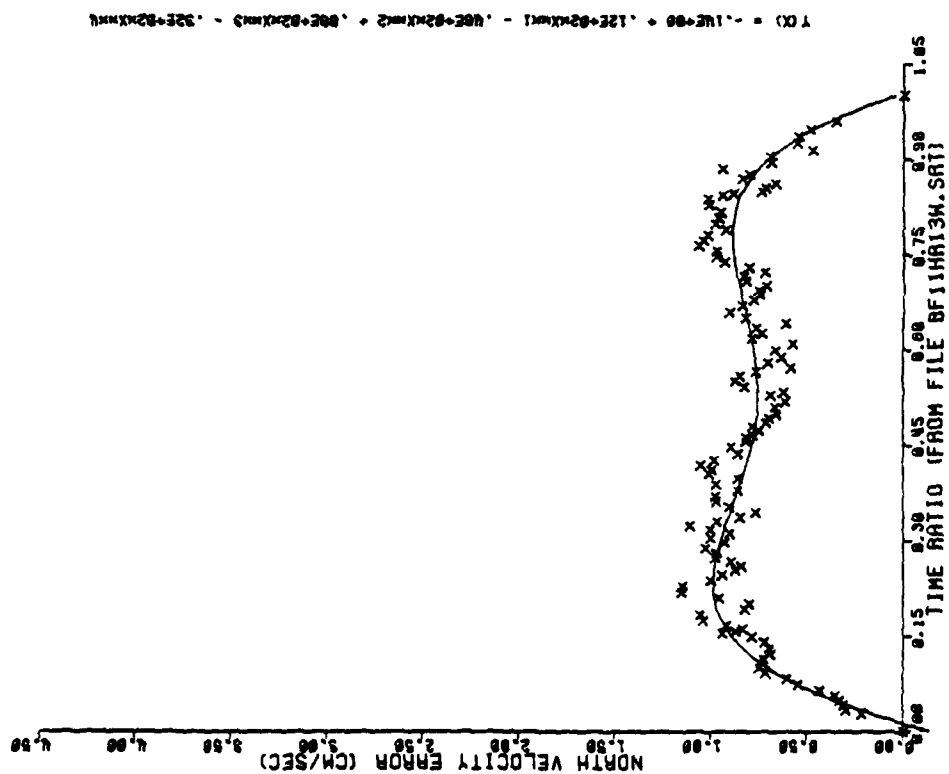


Figure 18. See text for more complete description.

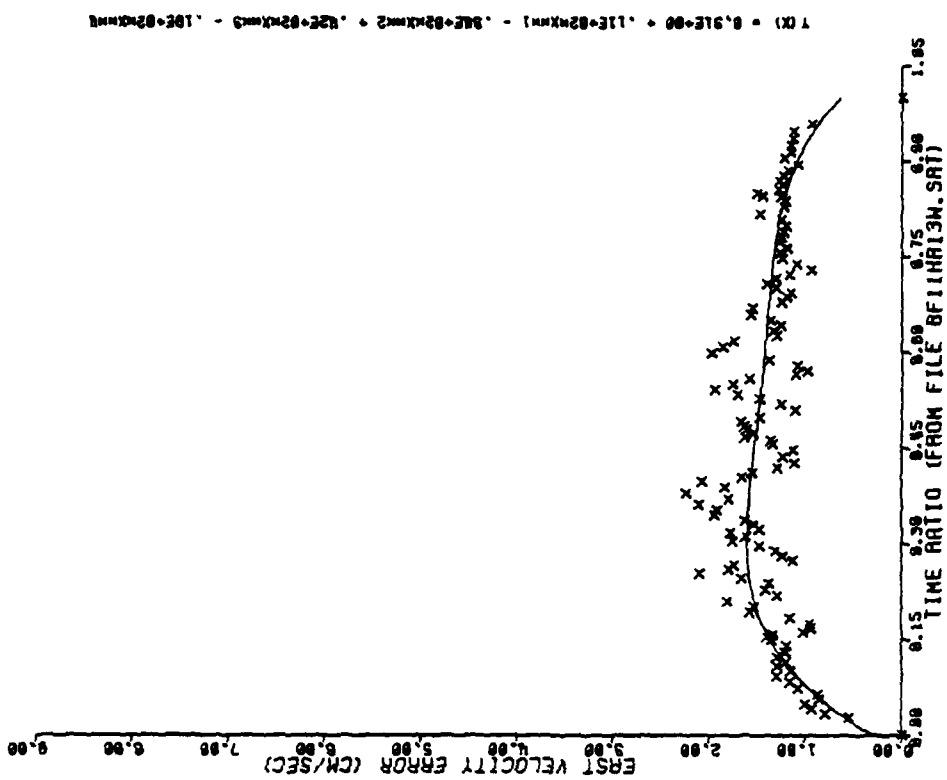


Figure 19. See text for more complete description.

The relative importance of these parameters can be seen in Figure 20. The six error equations corresponding to the total time differences of 1-2, 3-4, 6-7, 11-13, 23-25, and 47-49 hours are shown in the figure. Error estimates increase steadily with the total time differences previously listed. If we confine the data to time ratios from 0.2 to 0.8, a more reliable estimate of the importance of each parameter can be obtained. The justification being that all of the curves have roughly the same low errors near time ratios of 0.0 and 1.0. For any one of the curves in this range, the parameter of time ratio increases the error estimates at most by a factor of 3. The parameter of time difference, however, has a corresponding increase in error estimates as the cube of the time difference. Representing this in a mathematical form, we have:

$$E_e \approx [(3Rt), (Dt^3)] \quad (4)$$

The concept of time ratio was kept in the error equation for two reasons. The first reason was to give a worst error estimate, thereby allowing the user to select the best possible data for analysis. The other reason being that better than 95% of the error estimates provided to the oceanographic data set used the 1-2 hour time difference equation. At this low time difference, the time ratio becomes an equal contributor to estimation of errors.

Estimates of positions and velocities that required navigation points separated by more than 50 hours were given error defaults of 9999.9, even though the position and velocity were calculated. It was felt that after two days, error estimates would be extremely high (see equation 4) and therefore any resulting position and velocity must be flagged to indicate this. Error

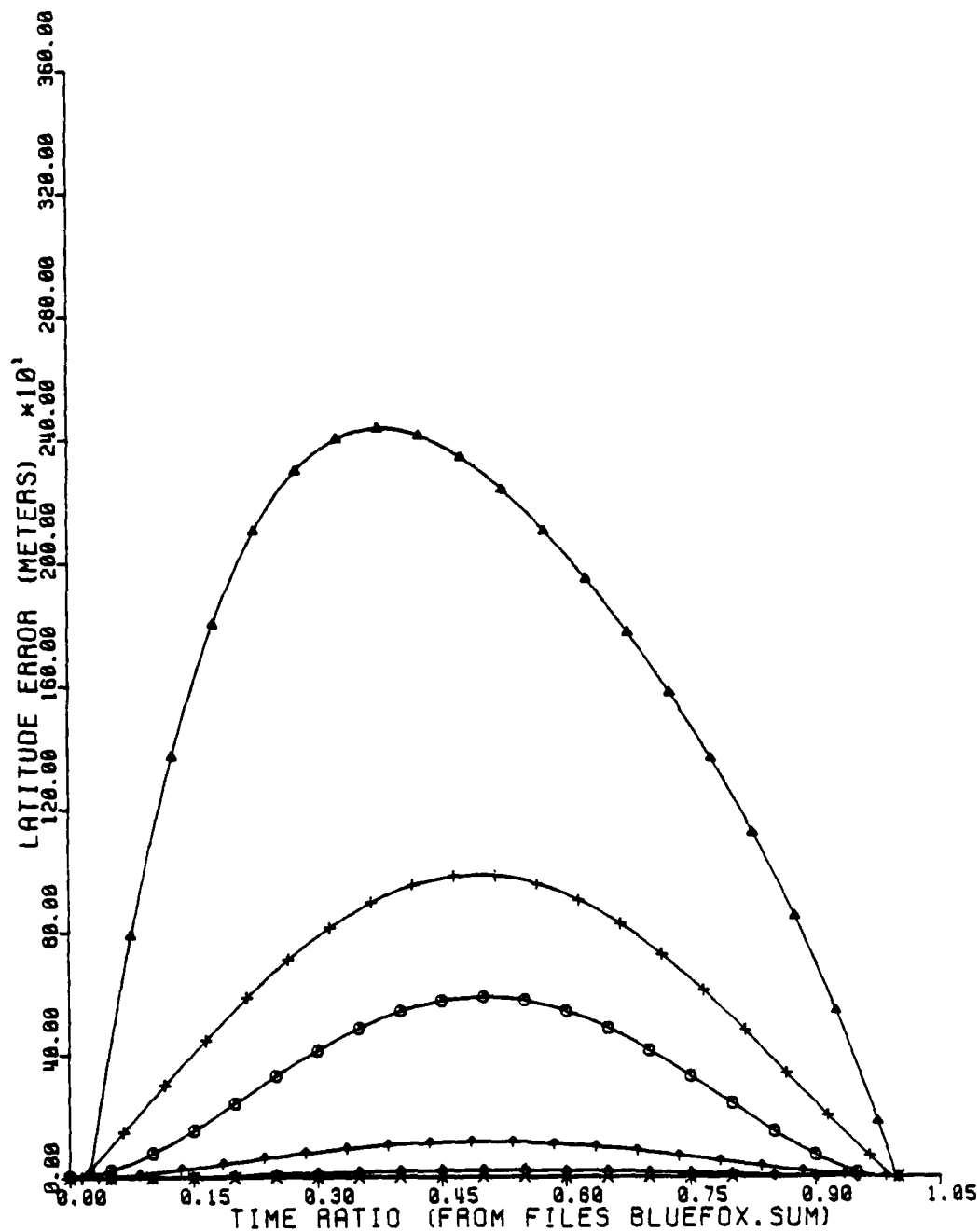


Figure 20. Shows relative importance of the time ratio and total time difference (Dt). The curves represent total time differences calculated from the summer data of Blue Fox. Symbols on the graph indicate the Dt as follows: x (1-2 HRS), diamond (3-4 HRS), up arrow (6-7 HRS), circle (11-13 HRS), + (23-25 HRS), and the triangle (47-49 HRS).

default data are extremely rare in this data set, however it should be reemphasized that the number is not to imply a quantitative estimate but designed to be a flag indicating questionable data.

Error estimates are also calculated to be negative in the cases where the time ratio is close to 0.0 or 1.0. These negative values are converted to zero since at these low time ratios, realistic errors are considered to be close to this value.

Coefficients for the 48 quadratic equations (4 equations per time band * 6 time bands per season * 2 seasons) were then placed in a computer program. With the maximum time difference and time ratio known, approximations to the 95% confidence error estimates could be computed for latitude, longitude, north and east ice velocity. These error estimates for position and ice velocity are in meters and cm/sec respectively. A copy of the subroutine listing that contains the coefficients of the quartic equations is shown in Appendix 2.

OUTPUT FORMAT OF FINAL DATA

This report consists entirely of absolute velocity data consisting of speed and direction at one meter intervals from the base of the ice to the maximum depth obtained by the sensor for any particular station. The limiting depth for all stations was 200 meters and was always obtained during low to moderate relative speeds in the water column. As the relative velocities increased, as in the presence of eddies, a significant portion of the 200 meters of cable was taken up in arching due to the increase in drag on the cable and sensor. During some eddies, maximum sensor depth may only be 140 meters even though the 200 meters of cable was payed out.

Station information is provided in two different formats, one being a numerical listing and the other being a plot of the profile. Two stations are graphically shown on one page of the data report. On the facing page, the corresponding numerical listing of the station is given.

The numerical data consist of other parameters relative to station information and are in some cases abbreviated to save space. A list of the parameters and their meaning is given in Table 3.

The plot of the absolute velocity profile is broken down into two components consisting of speed (shown as the solid line) and direction (shown as the dashed line). The speed scale is shown at the base of the profile. Three different scales for speed are used in the plotting of the figures, their respective maximum velocities being 25, 50 and 75 cm/sec. This was done to show as much structure as possible for the speeds indicated on any one particular profile. The directional scale is shown at the top of the profile and

is a fixed scale from 0 to 360 degrees relative to True North. The labeling of the plot consists of the camp identification, the station number, the date (day-month-year) and the time (GMT).

TABLE 3

BIG BEAR	First Main Camp
CARIBOU	Satellite Camp later to become Main Camp
BLUE FOX	Satellite Camp
SNOWBIRD	Satellite Camp
STATION	Consecutive station listing as shown on analog charts
(**M.)	Maximum depth of station in meters
LAT	Latitude of station in decimal degrees N implying North
LONG	Longitude of station in decimal degrees W implying West
LTER	Estimate of positional error for latitude in meters
LGER	Estimate of positional error for longitude in meters
NIVEL	North component of ice velocity (cm/sec)
EIVEL	East component of ice velocity (cm/sec)
NVER	Estimate of error in north ice velocity (cm/sec)
EVER	Estimate of error in east ice velocity (cm/sec)
DPT	Depth in meters
SPD	Absolute speed in cm/sec
DRN	Direction as related to True North. Directions with a code of 999.9 imply no direction reported.

Note ... All dates and times are given in terms of
Greenwich Mean Time.

FEATURES OBSERVED IN THE PROFILING CURRENT METER DATA

THE EKMAN LAYER

The concept of the planetary boundary layer, or Ekman layer, in which the velocity turns with depth, was first stimulated by observations of drifting ice. Nansen visualized the balances between surface wind stress, friction and Coriolis force which lead to a spiral structure for the current vectors. The idea was developed and set into mathematical form by Ekman. This layer, in which momentum exchange occurs between ice and water, was a central focus for the AIDJEX oceanographic program. Pack-ice forms a particularly stable platform for observations of behavior in the Ekman layer and observations of the Ekman spiral had been made from ice stations before the main AIDJEX experiment.

The PCM data, however, do frequently show indications of a spiral current structure in the upper layers. The vertically-integrated transport of water in the Ekman layer must flow at a right angle to the surface stress. In the northern hemisphere, the integrated flow is 90 degrees to the right of the surface stress. Water at the ice base will move with the ice in the direction of surface stress. Thus the current vectors will spiral downward to the right to achieve a net flow to the right. The exact shape of the spiral depends on the conditions of turbulence and stratification in the layer. A clockwise tendency for the current vectors is often noted in the current profiles. This indicates downward transfer of momentum from ice to water. Counterclockwise turning is also observed but less frequently. It indicates momentum transfer upwards from water to ice. Figures 21a and 21b show the

effect of ice velocity addition on an Ekman spiral. Figure 21a is the relative trace showing a well developed directional shear of approximately 360 degrees. With the addition of the ice velocity vector, the directional shear is somewhat altered as seen in Figure 21b. Notice also the high directional shears at low speeds.

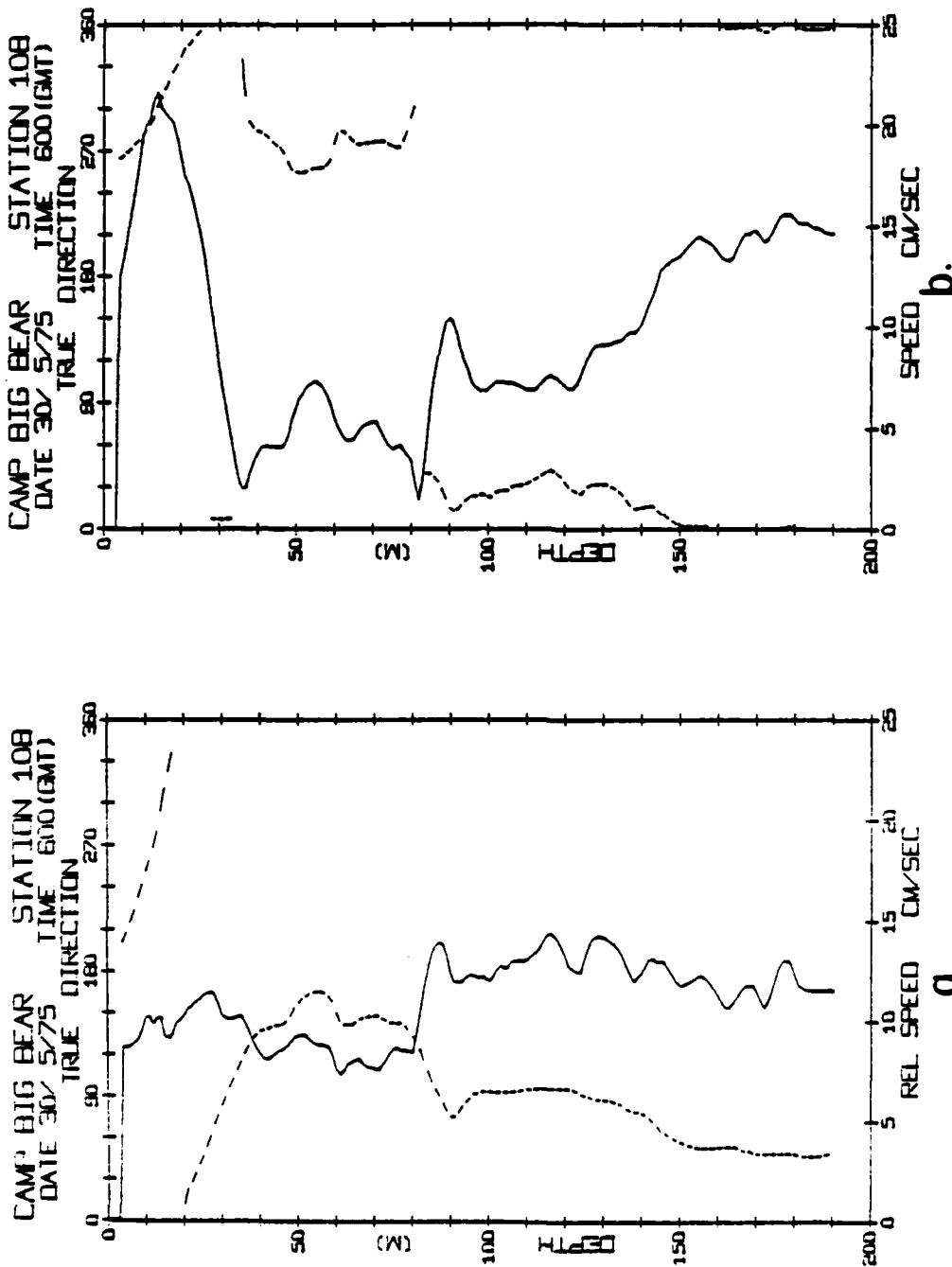


Figure 21. Graphically shows the result of adding the ice velocity vector to an Ekman spiral seen on a relative velocity profile (a) to produce absolute velocity data (b). Notice the change in directional shear between the relative and absolute profile from a depth of 20 to 40 meters.

SUBSURFACE EDDIES

Swift mesoscale undercurrents are one of the most notable oceanographic features observed in the AIDJEX area of the Arctic Ocean. The eddy form of these undercurrents was first described as a result of the 1972 AIDJEX pilot program. The eddies were shown to be 10 to 20 kilometers across and to extend in depth from 50 to 300 meters. The temperature and salinity fields as well as the velocity field are perturbed by the eddies which are baroclinic, and are approximately in geostrophic balance (Hunkins, 1974; Newton et al., 1974).

The 1975-76 data confirm that eddies are a common feature of this part of the Arctic Ocean. Maximum current speeds were found at depths ranging from 80 to 190 meters. In some cases current speeds attain a maximum of 59 cm/sec. Examples of different eddies at the four camps are shown in Figures 22-25. The 1972 data taken at discrete levels showed the rounded shape of the current profile. PCM data also show this but with some small scale structure imposed on the broad nose. There is often little directional shear through the eddy as in Figures 22 and 23, although, in some cases, as in Figures 24 and 25, there may be directional as well as speed shear through the eddy depth.

In Figures 26-29, current velocity vectors at four depths are plotted as a function of time at each of the four camps. Ice velocity vectors are at the top of each diagram. Days are numbered in sequence starting from January 1, 1975 (see Appendix 3). Examples of eddies are evident at each station. The eddy profiled in Figure 23 can be seen between days 151-155 of

Figure 27. The eddy profiled in Figure 24 appears in Figure 28 between days 150-154, while the eddy in Figure 25 appears in Figure 29, days 165-169. The eddy observed at Caribou, Figure 22, can be seen in Figure 26 between days 327 and 330. Although two of the eddies at different camps overlap in time, the camps are separated by 170 kilometers and are undoubtedly two distinct features. The tendency of the current vector to rotate with time is attributed to two reasons, (1) passage of the camp over the eddy, and (2) the translational velocity of the eddy. In most cases, the velocity of the camp is significantly greater than the velocity of the eddy. Profiles taken in this case appear to "freeze" the eddy as the camp passes over.

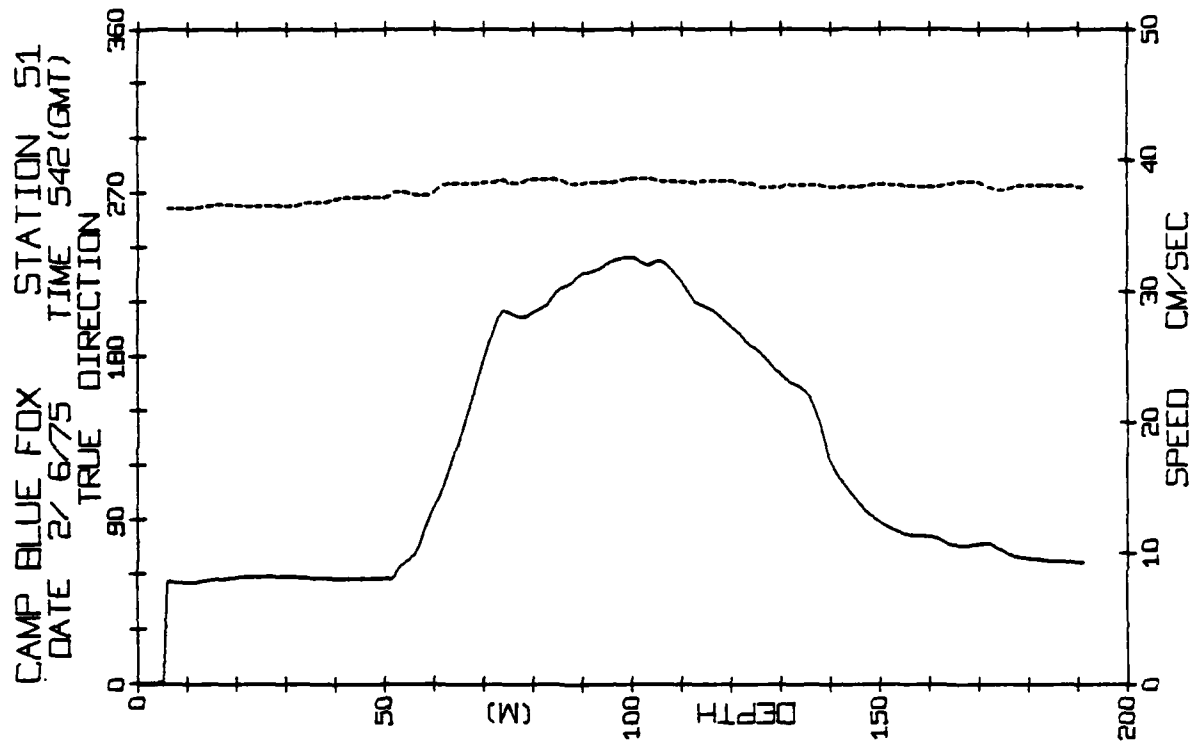


Figure 23. Eddy profile observed at camp Blue Fox.

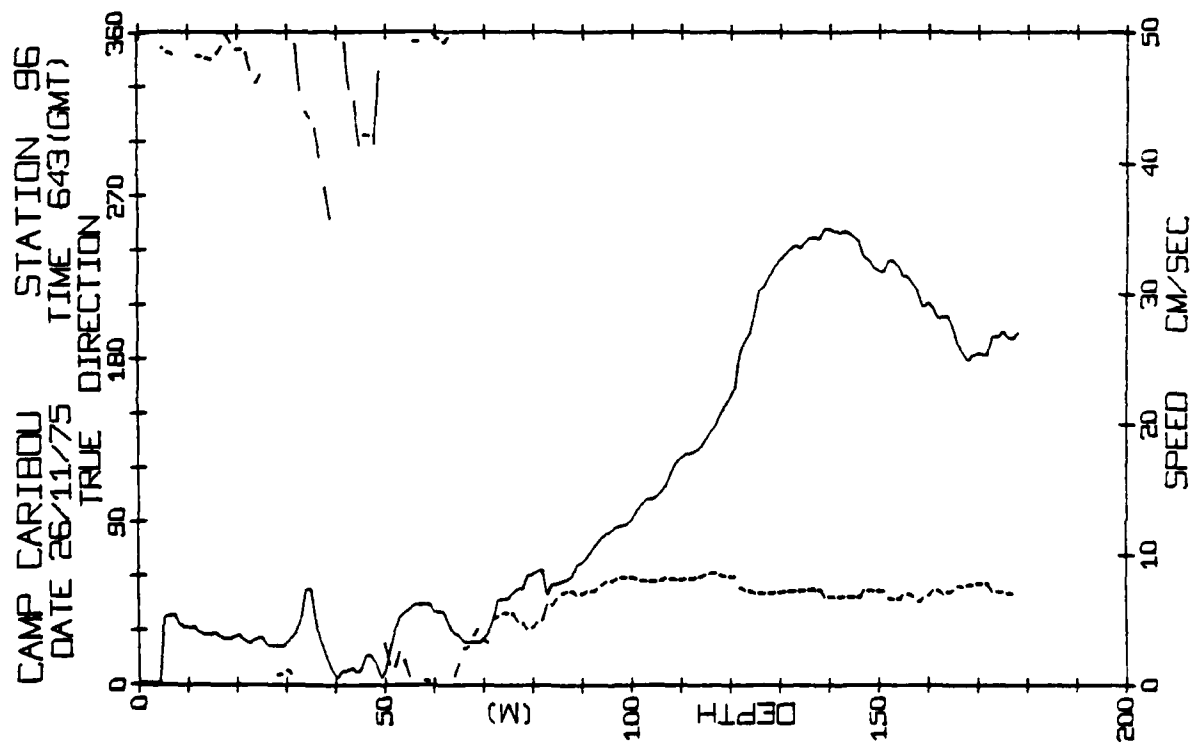


Figure 22. Eddy profile observed at camp Caribou.

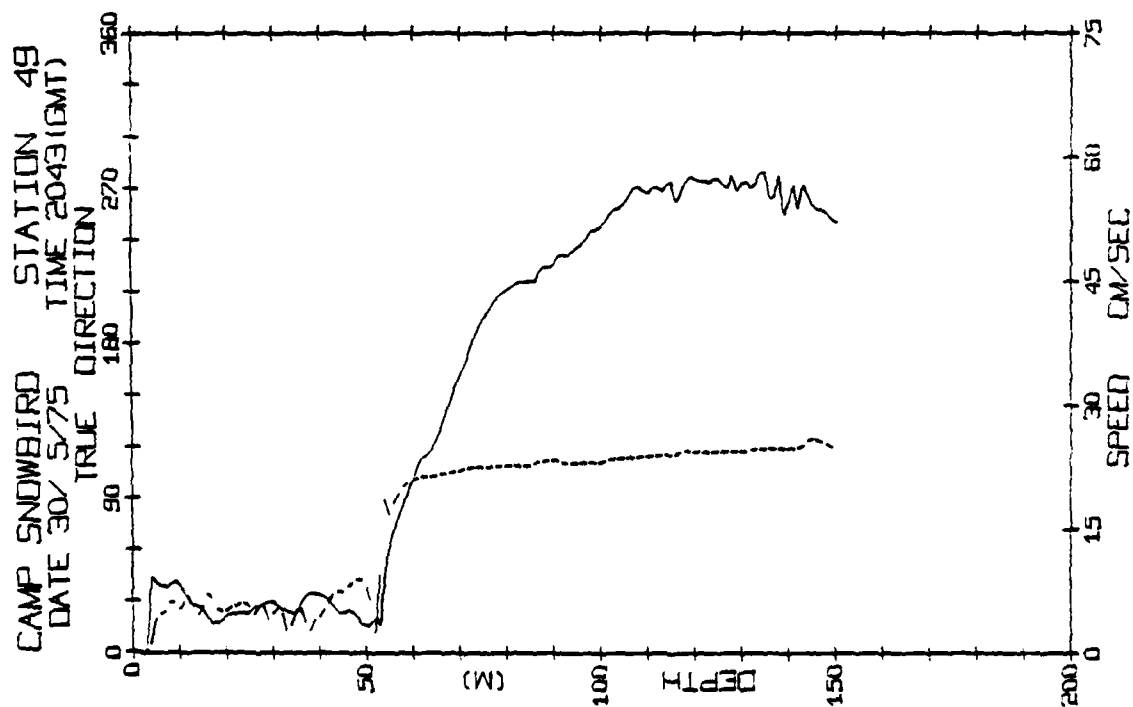


Figure 24. Eddy profile observed at camp Snowbird.

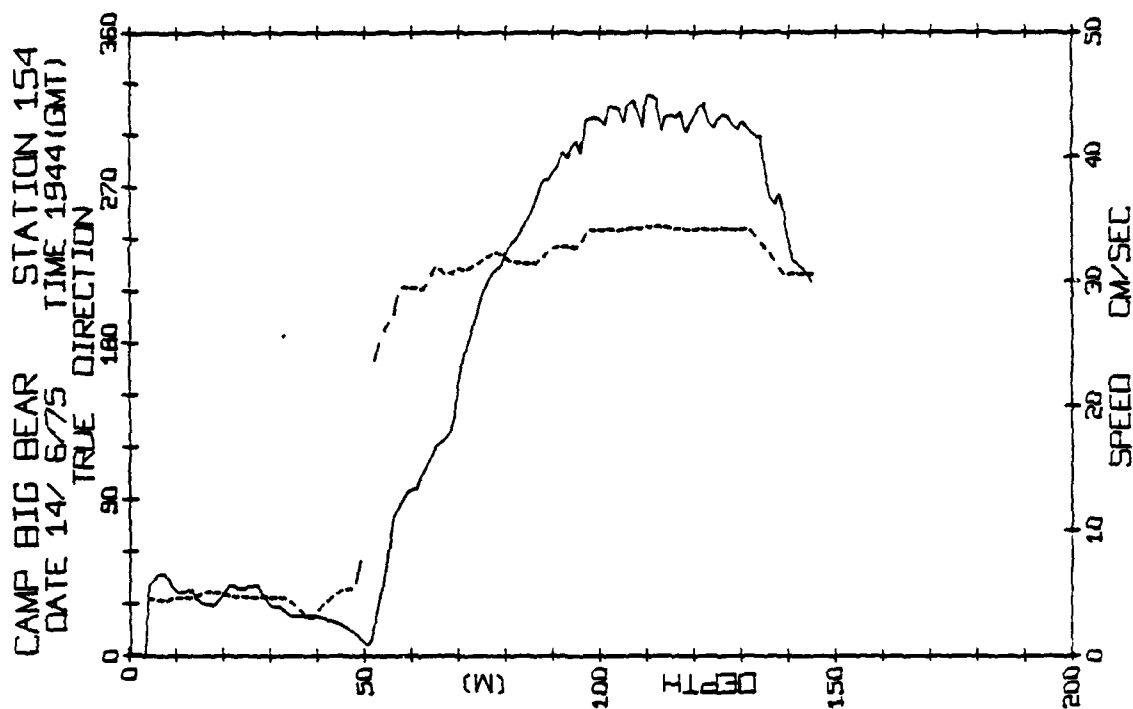


Figure 25. Eddy profile observed at camp Big Bear.

WIND-DRIVEN CURRENTS

Although the effect of wind-driven ice on the Ekman layer has been observed for some time, deeper influences have not been as carefully studied. Wind and ice motion are generally coherent over the array. There should be a clear separation of spatial scales between the ice-driven current scale of order 1000 kilometers and the baroclinic eddy scale of order 10 kilometers. Clear examples of barotropic currents appear in Figure 26, days 324-327, days 335-336, and days 368-370. These currents change little with depth, in contrast to the highly barotropic eddies. Other barotropic currents appear intermittently in Figures 27-29. However, random observations of eddies mask these currents below 50 meters. Such masking can be seen in Figure 27, days 170-174, Figure 28, days 149-156, and Figure 29, days 157-168.

Barotropic behavior is expected for currents generated by a transient wind stress. As the stress becomes less impulsive, more baroclinic motion would be produced. Thus the wind field at the largest time and space scales, the mean winds over the Canada Basin, generate the large scale Beaufort gyre. Short period wind and ice motion will result in a more barotropic response. Barotropic motions would not be reflected in the temperature and salinity profiles. They are detectable only with current meters or absolute measurements of surface height and tilt.

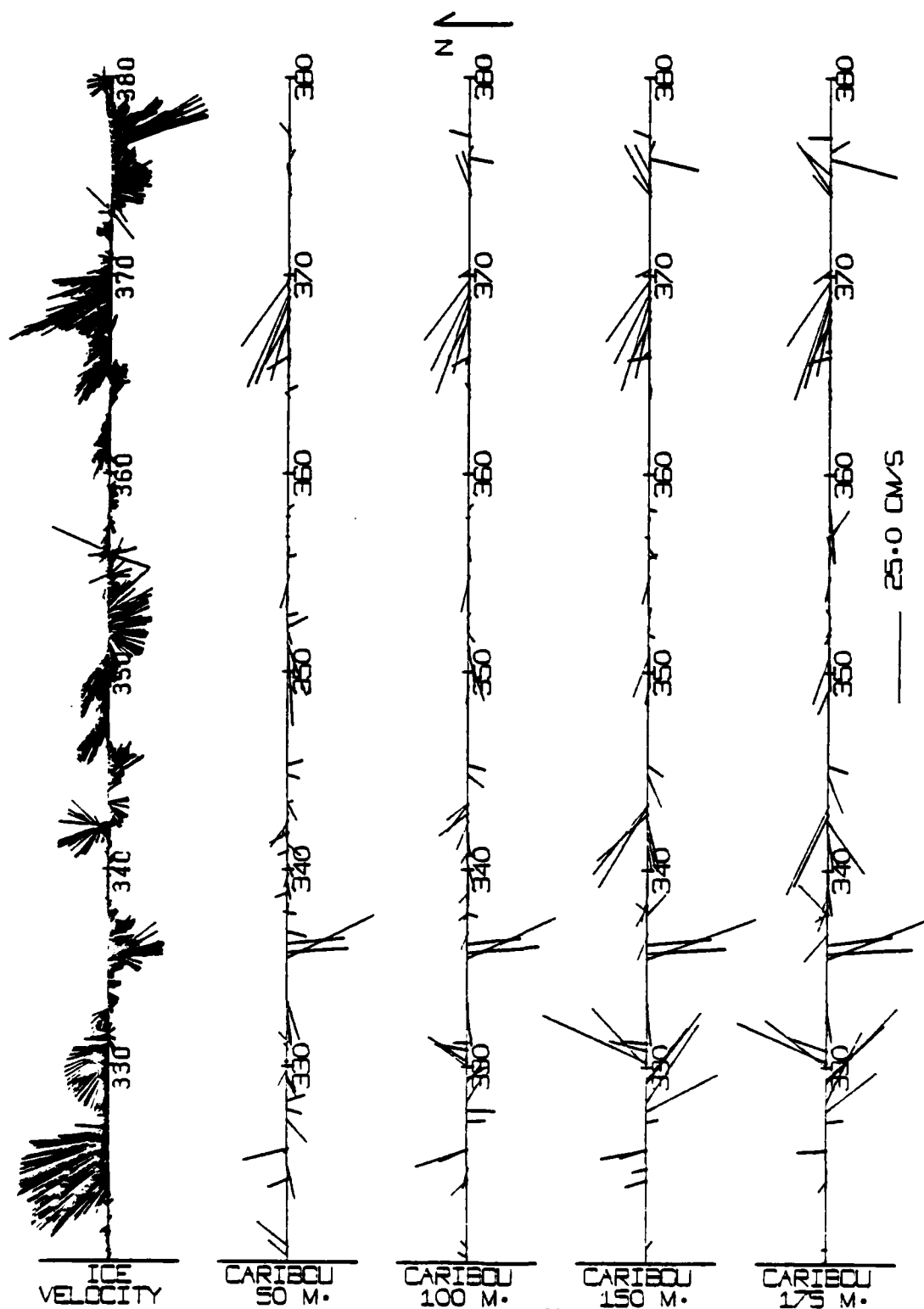


Figure 26. Stick diagram of profiling current meter data from camp Caribou at preselected depths of 50, 100, 150 and 175 meters. Ice velocity observed at camp is plotted at top of diagram. Vector pointing vertically upwards implies movement towards True North. AIDJEX days are shown on the horizontal axis.

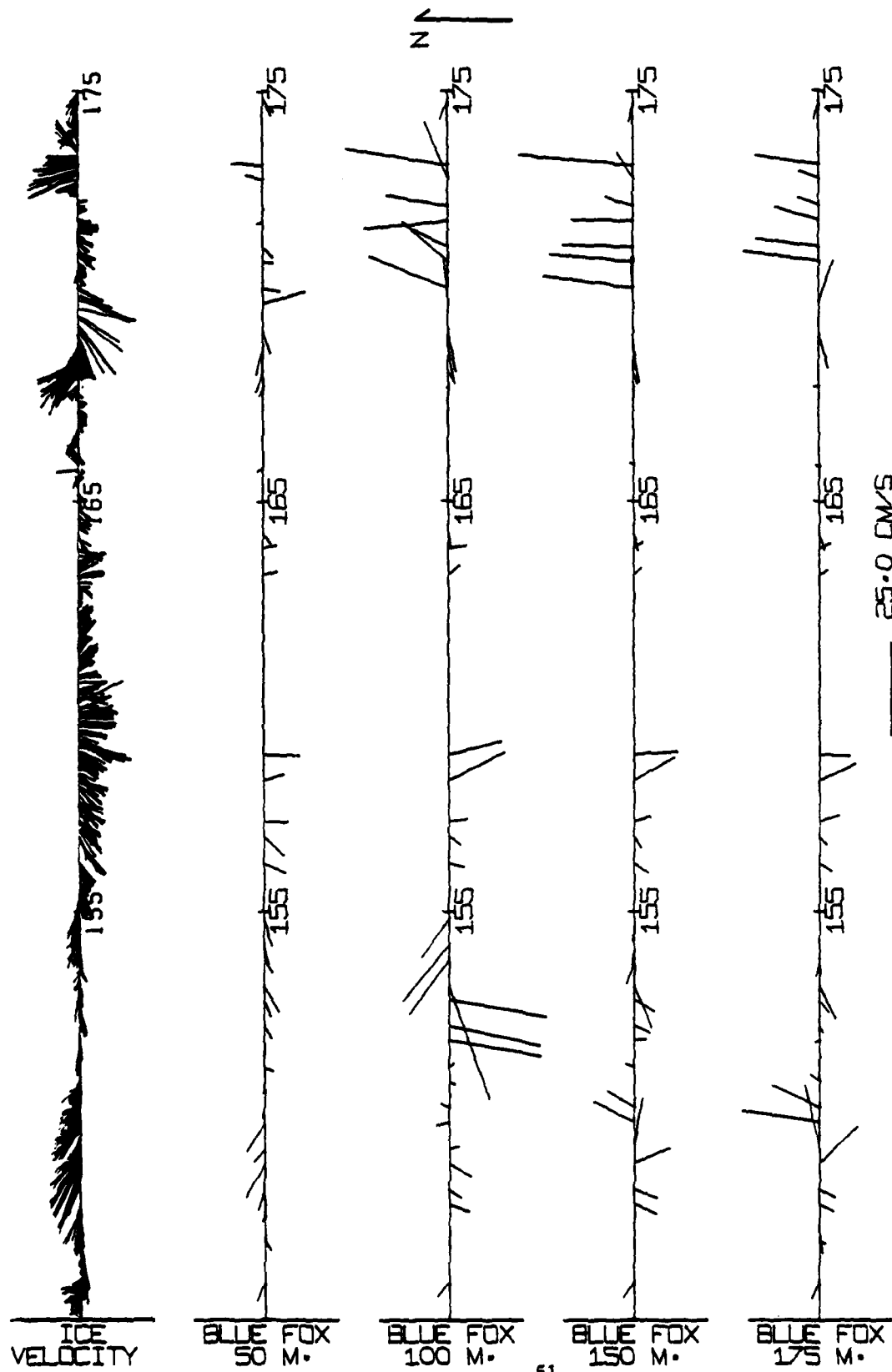


Figure 27. Stick diagram of profiling current meter data from camp Blue Fox at preselected depths of 50, 100, 150 and 175 meters. Ice velocity observed at camp is plotted at top of diagram. Vector pointing vertically upwards implies movement towards True North. ADJEX days are shown on the horizontal axis.

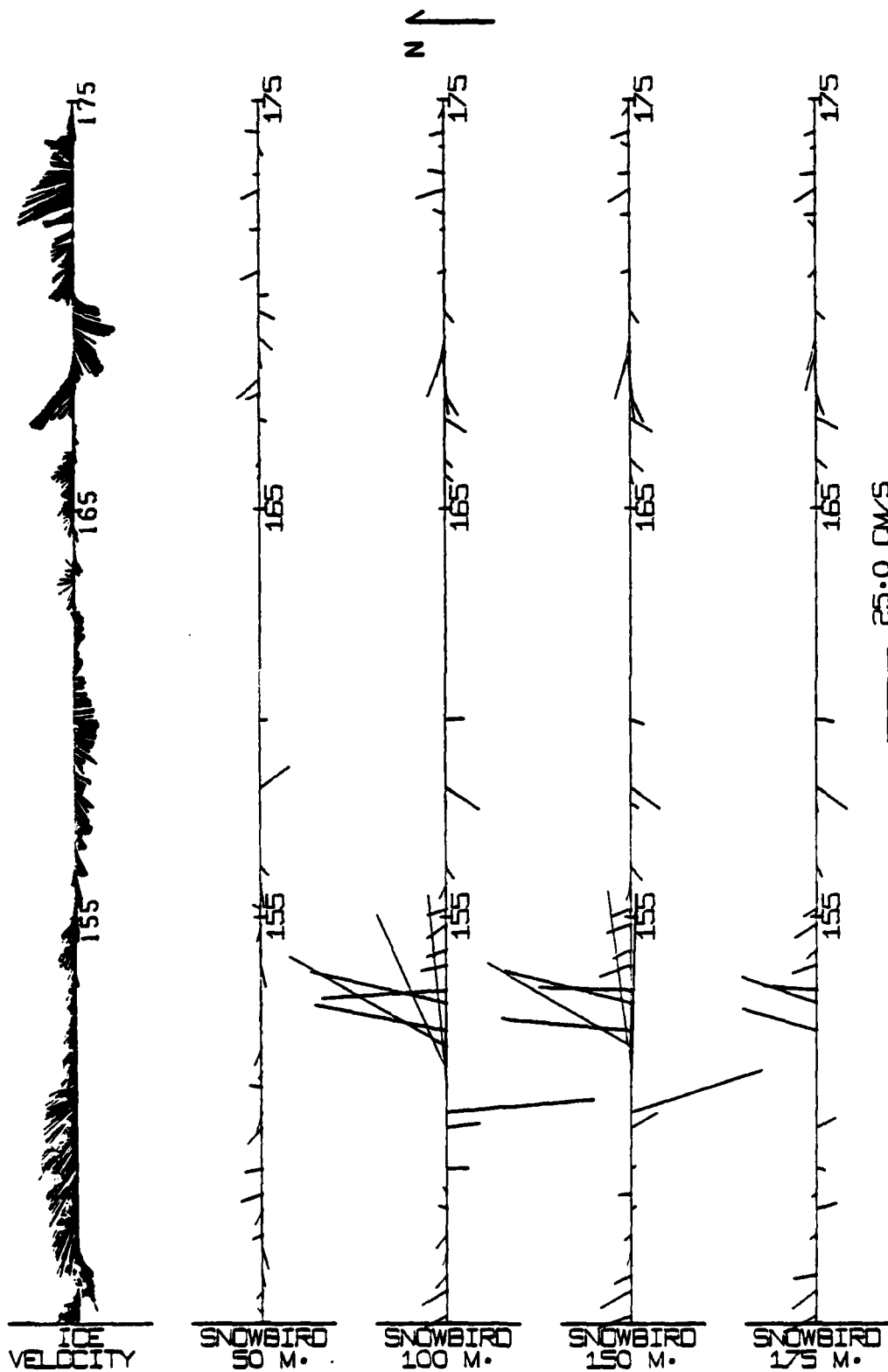


Figure 28. Stick diagram of profiling current meter data through time from camp Snowbird at preselected depths of 50, 100, 150 and 175 meters. Ice velocity observed at the camp is plotted at top of diagram. Vector pointing vertically upwards implies movement towards True North. AIDJEX days are shown on the horizontal axis.

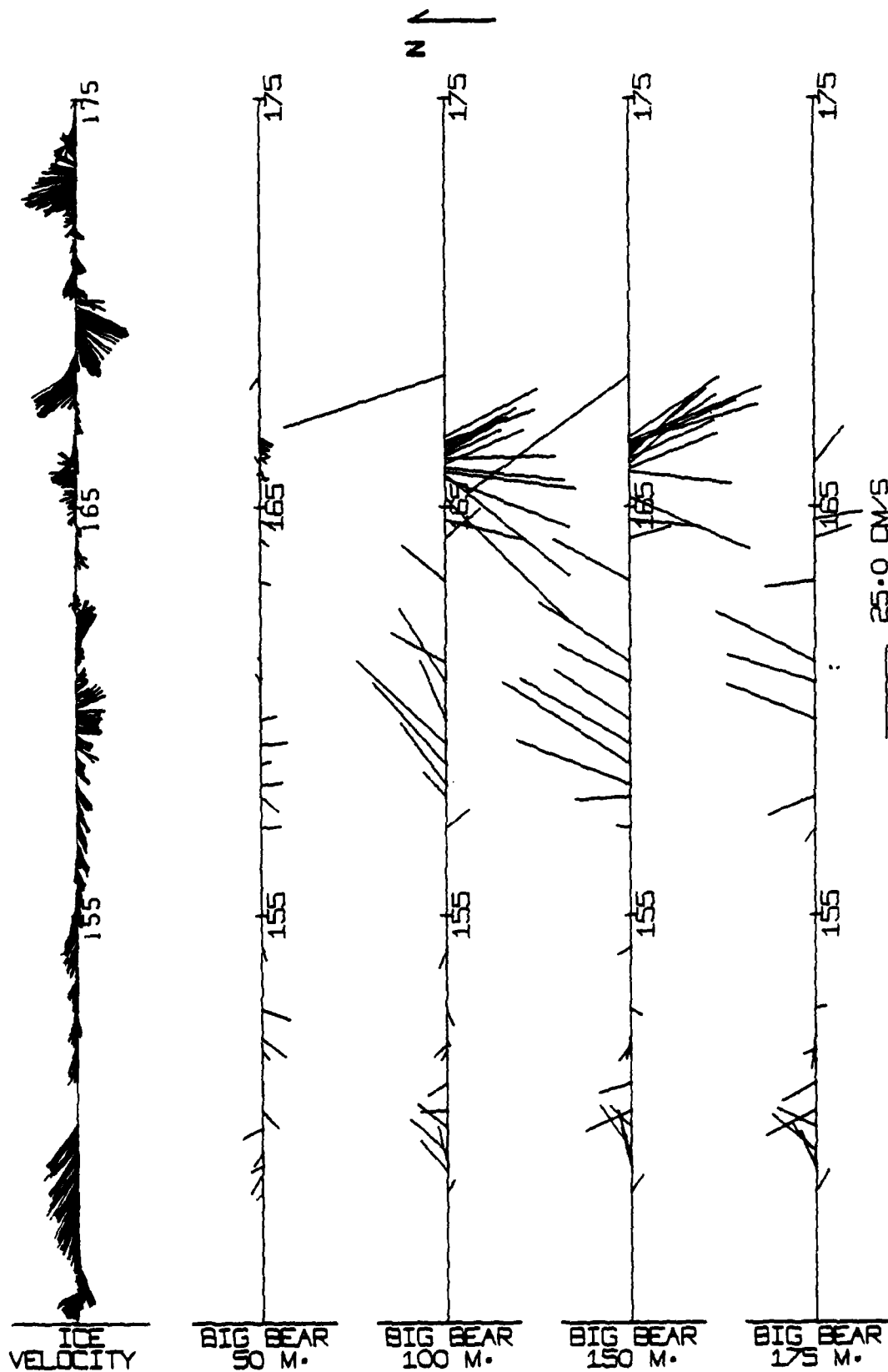


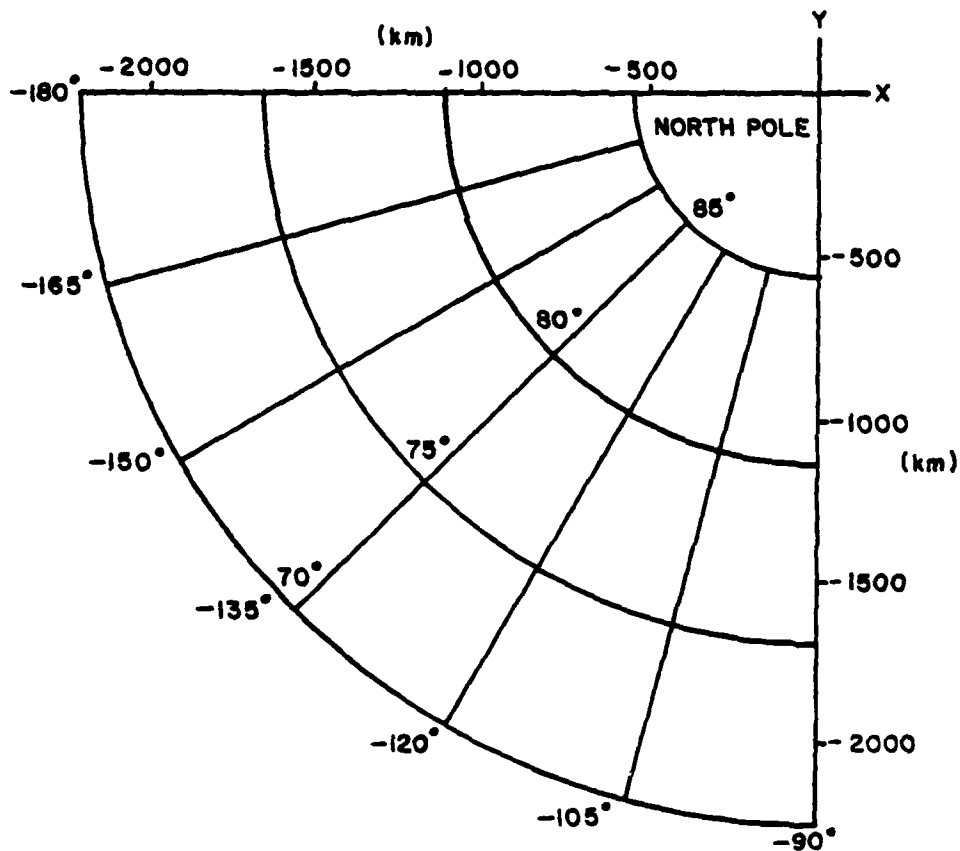
Figure 29. Stick diagram of profiling current meter data through time from camp Big Bear at preselected depths of 50, 100, 150 and 175 meters. Ice velocity observed at the camp is plotted at top of diagram. Vector pointing vertically upwards implies movement towards True North. AIDJEX days are shown on the horizontal axis.

ACKNOWLEDGEMENTS

The AIDJEX oceanographic program was carried out with the financial support from the Office of Naval Research under contract N00014-76-C-0004.

We are pleased to acknowledge the efforts of the people who operated the current meters at the various camps: Barry Allen, Jai Ardal, Bharrat Dixit, Alan Gill, Brian Hill, and Paul Peltola.

APPENDIX 1
COORDINATE SYSTEMS



Position measurements were made in geographical coordinates (latitude north, longitude east). The smoothing operation was done in a Cartesian system (x,y), where

$$x = 110.949 (90^\circ - \text{latitude}) \cos (\text{longitude}) \text{ (km)}$$

$$y = 110.949 (90^\circ - \text{latitude}) \sin (\text{longitude}) \text{ (km)}$$

APPENDIX 2

Subroutine PSNVEL is written in FORTRAN IV-PLUS and is adapted for use on a PDP 11/70. This subroutine calculates the position and ice velocity from the data base of Thorndike and Manley, 1980. Error estimates are also calculated for latitude, longitude, north and east ice velocities. The coefficients for the error estimate equations are found at the end of the subroutine. The actual equation is written as an arithmetic statement function near the beginning of the listing. Decimal AIDJEX days (Appendix 3) are used extensively in this subroutine.

```

C*****
C***** SUBROUTINE PSNVEL ***** AIDJEX POSITION AND VELOCITY DETERMINATION *****
C***** PROGRAMMER -- TOM MANLEY *****
C***** DATE -- AUG. 01, 1979 *****
C** SUBROUTINE PSNVEL INTERPOLATES BETWEEN TWO CONSECUTIVE POSITIONAL OBSER-
C** VATIONS USING THE UPDATED SATELLITE-NAVIGATION DATA AS ITS BASE. INTERPOL-
C** ATION IS BASED ON 2 CUBIC EQUATIONS DEFINED UNIQUELY BY THE BOUNDING NAV-
C** IIGATION POINTS.
C** ERROR ESTIMATES TO THE CALCULATED POSITION AND ICE VELOCITY ARE SUPPLIED
C** TO THE USER VIA THE 48 QUARTIC ERROR EQUATIONS DEFINED AT THE END OF THE
C** SUBROUTINE.
C** ALL DATES AND TIMES USED IN THE NAVIGATIONAL DATA SET AND THIS SUBROUTINE
C** MUST BE GREENWICH MEAN TIME.
C*****
C** INPUT PARAMETERS ARE AS FOLLOWS:
C** 1) IUNIT -- THE UNIT NUMBER THAT THE PROGRAM WILL USE IN OPENING THE
C** APPROPRIATE CAMP FILE. ** NOTE ** THE UNIT WILL BE OPENED
C** PERMANENTLY UNLESS THE CAMP IDENTIFIER CHANGES. IF THIS IS
C** TRUE, THEN THE CURRENT FILE WILL BE CLOSED AND THE NEW CAMP
C** NAVIGATION FILE WILL BE OPEN.
C** 2) ICAMP -- THE CAMP ALPHANUMERIC(A2) I.E.--> BB,CB,BF,SB,41
C** 3) IDAY -- THE DAY IN QUESTION
C** 4) MON -- THE MONTH IN QUESTION
C** 5) IYR -- THE YEAR IN QUESTION
C** 6) ITIME -- THE TIME IN QUESTION
C*****
C** OUTPUT PARAMETERS ARE AS FOLLOWS:
C** 1) RLAT -- LATITUDE OF THE STATION
C** 2) RLOK -- LONGITUDE OF THE STATION
C** 3) VELN -- NORTH VELOCITY IN CM/SEC
C** 4) VELE -- EAST VELOCITY IN CM/SEC
C** 5) LTERR -- ERROR ESTIMATE(95% CONFIDENCE) ON LATITUDE( IN METERS)
C** 6) LGERR -- ERROR ESTIMATE(95% CONFIDENCE) ON LONGITUDE( IN METERS)
C** 7) VNERR -- ERROR ESTIMATE(95% CONFIDENCE) ON NORTH VELOCITY( IN CM/SEC)
C** 8) VEERR -- ERROR ESTIMATE(95% CONFIDENCE) ON EAST VELOCITY( IN CM/SEC)
C**
C** ** NOTE ** IF THE LAT. AND LONG ARE NOT AVAILABLE, THE SUBROUTINE
C** GIVES THE FOLLOWING INFORMATION:
C** RLAT = 9999.9 RLOK = 9999.9
C** VELN = 9999.9 VELE = 9999.9
C** LTERR = 9999.9 LGERR = 9999.9
C** VNERR = 9999.9 VEERR = 9999.9
C**
C** ** NOTE ** IF THE BOUNDING SETS OF NAVIGATION DATA USED TO DEFINE THE
C** CUBIC EQUATIONS ARE MORE THAN 50 HOURS APART, POSITION AND ICE VELOCITY
C** WILL BE PROVIDED. DEFAULT VALUES WILL HOWEVER BE ASSIGNED TO THE ERROR
C** ESTIMATES AS FOLLOWS:
C** LTERR = 9999.9 LGERR = 9999.9
C** VNERR = 9999.9 VEERR = 9999.9
C*****
C** PARAMETERS THAT ARE NOT TO BE CHANGED BY THE USER DURING A RUN:
C** 1) FILE -- INDICATES THE FILE HAS ALREADY BEEN OPENED
C** 'YES' IF TRUE, 0 IF NO
C** THIS CUTS DOWN ON THE AMOUNT OF TIME SPENT OPENING AND CLOS-
C** ING THE FILE.
C** 2) ICMPCK - INTEGER CAMP CHECK VARIABLE. THIS HOLDS THE ID "CODE" OF THE
C** CAMP NUMBER WHOSE NAVIGATION FILE IS CURRENTLY OPENED.
C** IF ICMPCK AND ICAMP DO NOT AGREE, THEN THE CURRENT FILE
C** IS CLOSED AND THE NEW NAVIGATION FILE CORRESPONDING TO THE
C** NEW CAMP ID "ICAMP" IS OPENED. ICMPCK IS THEN CHANGED TO
C** ICAMP.
C** 3) IDBSE - THE INTEGER THAT HOLDS THE BASE DAY SUBTRACTION CONSTANT
C** USED BY THE SUBROUTINE TO DETERMINE THE LOCATION OF ALL THE
C** DAYS IN THE NAVIGATION FILE. -----> UNDER NO CIRCUMSTANCES
C** SHOULD THIS VARIABLE BE CHANGED DURING A RUN ON ANY ONE CAMP.
C** 4) IYRSE - THE INTEGER THAT HOLDS THE BASE YEAR UPON WHICH THE JULIAN
C** DAY IS DETERMINED. THE BASE YEAR IS DETERMINED THROUGH THE
C** SUBROUTINE "CPCODE" AS ONE OF THE OUTPUT PARAMETERS. BASE
C** YEARS WILL CHANGE WITH THE CAMPS SUCH AS THE MAIN AIDJEX
C** EXPERIMENT BEING BASED ON THE YEAR 1975. THE FRAM 1 DATA IS
C** BASED ON THE YEAR 1979. -----> UNDER NO CIRCUMSTANCES
C** SHOULD THIS VARIABLE BE CHANGED DURING A RUN ON ANY ONE CAMP.
C*****
C*****
C*****

```

```

C*****
C****
C*
C**
C**
SUBROUTINE PSNVEL(IUNIT, ICAMP, IDAY, MON, IYR, ITIME, FILE, RLAT, RLON,
1 VELN, VELE, LTERR, LGERR, VNERR, VEERR, ICMPCK, IDBSE, IYRBSE)
C**
IMPLICIT REAL*8 (Z)
REAL*8 RAD
REAL LTERR, LGERR
BYTE FILNAM(30), DIR(11)
DIMENSION INAM(4)
C**
C** DEFINE A FUNCTION FOR THE QUARTIC ERROR ESTIMATES
C**
Q(E,D,C,B,A,T)=A*T**4 + B*T**3 + C*T**2 + D*T + E
C**
C** SET AN ERROR CODE
C**
CALL ERRSET(39,.TRUE.,.FALSE.,.TRUE.,.FALSE.,100)
C**
C**
DATA FILNAM(30)/0/
RAD = DASIN(1.000)/90.000
C**
C** CHECK TO SEE IF FILES ARE ALREADY OPENED
C**
10 IF((ICMPCK.EQ.ICAMP) .AND. (FILE.EQ. 'YES')) GO TO 77
IF((ICMPCK.NE.ICAMP) .AND. (FILE.NE. 'YES')) GO TO 19
IF((ICMPCK.NE.ICAMP) .AND. (FILE.EQ. 'YES')) GO TO 15
15 CLOSE(UNIT=IUNIT)
18 ENCODE(20,23,FILNAM) ICAMP
23 FORMAT('DR2:[310,1]NAVDAT.',A2)
ICMPCK = ICAMP
C**
OPEN(UNIT=IUNIT,NAME=FILNAM,TYPE='OLD',
1 ACCESS='DIRECT',FORM='FORMATTED',RECORDSIZE=70)
FILE = 'YES'
C***=> FIND THE BASE YEAR FOR THE CAMP DATA
I = 0
CALL CPCODE(ICAMP,I,ZCAMA9,IYRBSE)
C***=> NOW FIND THE BASE JULIAN DAY THAT THE FILE WAS BASED ON USING THE
C***=> EQUATION IREC = (IJULDAY-IBASEDAY)*75 -1
DO 27 IREC = 1,2000
READ(IUNIT,IREC,20) RDAY
IF(RDAY.EQ. 0.0) GO TO 27
IDY = RDAY
IDBSE = IDY - IFIX(((IREC-1)/75.))+.5)
D TYPE 31, ICAMP, IDY, IREC, IDBSE
D 31 FORMAT(2X, 'CAMP-> ',A2, ' DAY/IREC/IDBASE=> ',3I6)
GO TO 28
27 CONTINUE
28 CONTINUE
C**
C** CALCULATE THE RECORD NUMBER OF THE FIRST NAVIGATION POINTS CLOSEST
C** TO THE TIME OF THE STATION IN QUESTION
C**
77 CALL JULDAY(IDAY,MON,IYR,ITIME,IYRBSE,RDAY)
IADY = RDAY
IREC = (IADY - IDBSE)*75 + 1
D TYPE 66, IREC, IADY, IAPER
D 66 FORMAT(2X, 'IREC/IADY/IAPER--> ',3I6)
C**
C** CHECK FOR BAD RECORD NUMBER
C**
IF(IREC.GE. 1) GO TO 79
45 RLAT = 9999.9
RLON = 9999.9
VELN = 9999.9
VELE = 9999.9
VNERR = 9999.9
VEERR = 9999.9
LTERR = 9999.9
LGERR = 9999.9
GO TO 300
C**
C** READ THE RECORD
C**
79 READ(IUNIT,IREC,20) DAYS,RLATS,RLONS,VELNS,VELES

```



```

20 FORMAT(2X,3F12.6,2F8.1)
C**
C** IF THE BEGINNING RECORD HAS NO INFORMATION ON IT, KEEP INCREMENTING
C** THE IREC COUNTER UNTIL A RECORD WITH INFORMATION HAS BEEN FOUND
C**
      IF(DAYS .NE. 0.0) GO TO 83
      IREC = IREC + 1
      GO TO 79
C**
C** TURN THE DESIRED TIME INTO DECIMAL DAYS
C**
      83 IHR = ITIME/100.0 + .01
      IMN = (ITIME-(IHR*100))
      DAYSTN = (IADY*1.0) + (IHR/24.0) + (IMN/1440.)
      IDYSTN = DAYSTN
      TYPE 87, DAYSTN
D 87 FORMAT(2X,'TIME OF DESIRED POINT => ',F12.6)
C**
C** CHECK TO SEE WHICH RECORD TO READ FOR THE BOUNDING INFORMATION
C**
C**
      IF((IDYSTN.LT.IDBSE) .AND. (IDYSTN.GT.500)) GO TO 45
      IF((IDYSTN.EQ.IDBSE) .AND. (DAYSTN.LT.DAYS)) GO TO 45
      IF(DAYSTN .LT. DAYS) GO TO 50
      IF(DAYSTN .GE. DAYS) GO TO 100
C** READ PREVIOUS RECORD
C**
      50 IREC = IREC -1
      READ(IUNIT,IREC,20) DAYE,RLATE,RLONE,VELNE,VELEE
C**=> CHECK FOR RECORD WITH NO DATA LISTED ON IT
      IF((RLATE.EQ.0.0).OR.(RLONE.EQ.0.0)) GO TO 50
C* => REORIENT THE DATA SO DAYS IS FIRST IN TIME, DAYE IS LAST
      DY = DAYS
      RL = RLATS
      RG = RLONS
      VN = VELNS
      VE = VELFS
      DAYE = DAYE
      RLATS = RLATE
      RLONS = RLONE
      VELNS = VELNE
      VELES = VELEE
      DAYE = DY
      RLATE = RL
      RLONE = RG
      VELNE = VN
      VELEE = VE
      GO TO 200
C**
C** READ FOLLOWING RECORD
C**
      100 IREC = IREC + 1
      READ(IUNIT,IREC,20,ERR=45) DAYE,RLATE,RLONE,VELNE,VELEE
C**=> CHECK FOR RECORD WITH NO DATA LISTED ON IT
      IF((RLATE.EQ.0.0).OR.(RLONE.EQ.0.0)) GO TO 100
      IF(DAYSTN .LE. DAYE) GO TO 200
      DAYS = DAYE
      RLATS = RLATE
      RLONS = RLONE
      VELNS = VELNE
      VELES = VELEE
      GO TO 100
C**
C** START WITH TIME INTERPOLATION FOR LATITUDE AND VELOCITY NORTH
C**
C**=> CHANGE TIME POINTS IN DAYS TO TIME POINTS IN SECONDS
      200 CONTINUE
D TYPE 43, DAYS,RLATS,RLONS,VELNS,VELES
D 43 FORMAT(2X,'START=> ',3F12.6,2F8.1)
D TYPE 24, DAYE,RLATE,RLONE,VELNE,VELEE
D 24 FORMAT(2X,'END => ',3F12.6,2F8.1)
      ZT1 = DAYS*86400.D0
      ZT2 = DAYE*86400.D0
      ZTS = DAYSTN*86400.D0
      ZC = ZT2 - ZT1
C**=> CHANGE THE VEL TO DEGREES (LAT OR LONG)/SEC
      ZVELNS = VELNS/11094900.D0
      ZVELNE = VELNE/11094900.D0
      ZVELES = VELES/(11094900.D0*DCOS(RLATS*RAD))
      ZVELEE = VELEE/(11094900.D0*DCOS(RLATE*RAD))

```

```

ZATNT = ZTS - ZT1
ZALP = (ZVELNE - ZVELNS)/(3.00*ZC**2)
ZBET = -2.00/(3.00*ZC)
ZB = (RLATE-RLATS-ZVELNS*ZC-ZALP*ZC**3)/(ZBET*ZC**3+ZC**2)
ZA = ZALP + ZBET*ZB
RLAT = (ZA*ZATNT**3)+(ZB*ZATNT**2)+(ZVELNS*ZATNT)+RLATS
ZVELN = (3.00*ZA*ZATNT**2)+(2.00*ZB*ZATNT)+ZVELNS

C**
C** NOW FIGURE OUT THE LONGITUDE AND THE VELOCITY EAST
C**
ZALP = (ZVELEE - ZVELES)/(3.00*ZC**2)
ZBET = -2.00/(3.00*ZC)
ZB = (RLONE-RLONS-ZVELES*ZC-ZALP*ZC**3)/(ZBET*ZC**3+ZC**2)
ZA = ZALP + ZBET*ZB
RLON = (ZA*ZATNT**3)+(ZB*ZATNT**2)+(ZVELES*ZATNT)+RLONS
ZVELE = (3.00*ZA*ZATNT**2)+(2.00*ZB*ZATNT)+ZVELES
C** CHANGE VEL BACK TO CM/SEC
VELN = ZVELN*11094900.00
VELE = ZVELE*(11094900.00*DCOS(RLAT*RAD))
D
TYPE 57, RLAT, RLON, VELN, VELE
D
57 FORMAT(2X, 'LAT/LON/VN/VE=> ', 4F10.4)
C**
C** CALCULATE TIME RATIO AND TOTAL TIME DIFFERENCE FOR ERROR ESTIMATES
C**
SDIF = ZATNT/3.600E3
TDIF = ZC/3.600E3
T = SDIF/TDIF
D
TYPE 47, SDIF, TDIF, T
D
47 FORMAT(2X, 'SDIF/TDIF/T=> ', 3(F8.4, 1X))
C**
C** CHECK FOR SUMMER OR WINTER DATA
C**
IF((IDYSTN.LT.182).OR.(IDYSTN.GT.273)) GO TO 205
C**==> THIS IS SUMMER DATA
C**==> NOW CHECK FOR THE SDIF TIME BOUNDS
IF(TDIF.GT.2.00) GO TO 110
C**==> THIS IS ERROR DATA BETWEEN 1 AND 2 HOURS
LTERR=Q(-.192869,-.575945E1,.700460E2,-.134647E3,.702872E2,T)
LGERR=Q(.202941,-.468376E1,.903089E2,-.179822E3,.940866E2,T)
VNERR=Q(-.264094E-1,.164596E1,-.672279E1,.976800E1,-.466455E1,T)
VEERR=Q(.190725E-1,.182885E1,-.574349E1,.761949E1,-.374149E1,T)
GO TO 300
110 IF(TDIF.GT.4.00) GO TO 120
C**==> THIS IS ERROR DATA BETWEEN 3 AND 4 HOURS
LTERR=Q(-.190364E1,-.466727E2,.553386E3,-.983192E3,.474845E3,T)
LGERR=Q(-.391057E1,-.105472E3,.118601E4,-.209909E4,.101307E4,T)
VNERR=Q(-.220280,-.878184E1,-.362110E2,.544938E2,-.267458E2,T)
VEERR=Q(-.466398,.180550E2,-.748721E2,.114565E3,-.574648E2,T)
GO TO 300
120 IF(TDIF.GT.7.00) GO TO 130
C**==> THIS IS ERROR DATA BETWEEN 6 AND 7 HOURS
LTERR=Q(-.434573E1,.810672E2,.156793E4,-.335384E4,.170874E4,T)
LGERR=Q(-.406848E1,-.644965E2,.260012E4,-.513404E4,.259836E4,T)
VNERR=Q(-.168660,.223409E2,-.950057E2,.146842E3,-.745103E2,T)
VEERR=Q(-.461851E-1,.212938E2,-.807473E2,.119812E3,-.606414E2,T)
GO TO 300
130 IF(TDIF.GT.13.00) GO TO 140
C**==> THIS IS ERROR DATA BETWEEN 11 AND 13 HOURS
LTERR=Q(-.551924E1,-.312993E2,.945618E4,-.188342E5,.939432E4,T)
LGERR=Q(-.203458E2,-.355332E3,.103268E5,-.194064E5,.940165E4,T)
VNERR=Q(-.450471,-.627998E2,-.266976E3,.413131E3,-.209935E3,T)
VEERR=Q(-.399648,.599848E2,-.249716E3,.387004E3,-.197477E3,T)
GO TO 300
140 IF(TDIF.GT.25.00) GO TO 150
C**==> THIS IS ERROR DATA BETWEEN 23 AND 25 HOURS
LTERR=Q(-.407233E2,.278504E4,-.285207E4,-.116745E5,.605943E4,T)
LGERR=Q(-.170113E3,.661352E4,-.170675E5,.213869E5,-.110412E5,T)
VNERR=Q(-.169221E1,.297300E2,-.644268E2,.657767E2,-.309871E2,T)
VEERR=Q(-.250704E1,.164704E2,-.889819E1,-.181705E2,.106707E2,T)
GO TO 300
150 IF(TDIF.GT.50.00) GO TO 160
C**==> THIS IS ERROR DATA BETWEEN 47 AND 49 HOURS
LTERR=Q(-.429890E3,.193509E5,-.443267E5,.406707E5,-.152876E5,T)
LGERR=Q(-.341247E3,.155251E5,-.331577E5,.317635E5,-.140253E5,T)
VNERR=Q(-.419435E1,.583175E2,-.252295E3,.377632E3,-.186022E3,T)
VEERR=Q(-.143486E1,.854762E2,-.354166E3,.525771E3,-.256694E3,T)
GO TO 300
160 CONTINUE
C**==> NO DATA FOR TDIF GREATER THAN 50 HOURS, SET TO DEFAULT
VEERR= 9999.9

```

```

      VNERR= 9999.9
      LGERR= 9999.9
      LTERR= 9999.9
      GO TO 300
C**==> THIS IS THE WINTER DATA SET
205 IF(TDIF .GT. 2.00) GO TO 210
C**==> THIS IS ERROR DATA BETWEEN 1 AND 2 HOURS
      LTERR=Q(.247002,-.141055E1,.239450E2,-.475730E2,.248538E2,T)
      LGERR=Q(.177059,-.408318E1,.556174E2,-.108728E3,.564677E2,T)
      VNERR=Q(.735694E-2,.658285,-.274560E1,.408656E1,-.201109E1,T)
      VEERR=Q(.214845E-1,.138559E1,-.561334E1,.830719E1,-.412921E1,T)
      GO TO 300
210 IF(TDIF .GT. 4.00) GO TO 220
C**==> THIS IS ERROR DATA BETWEEN 3 AND 4 HOURS
      LTERR=Q(.136832E1,-.282074E2,.306371E3,-.542406E3,.262633E3,T)
      LGERR=Q(.286660E1,-.795060E2,.941639E3,-.171066E4,.846418E3,T)
      VNERR=Q(-.602995E-1,.418834E1,-.178370E2,.275296E2,-.136677E2,T)
      VEERR=Q(-.284836,.133084E2,-.557777E2,.852540E2,-.426655E2,T)
      GO TO 300
220 IF(TDIF .GT. 7.00) GO TO 230
C**==> THIS IS ERROR DATA BETWEEN 6 AND 7 HOURS
      LTERR=Q(-.549117,.123283E2,.594540E3,-.118623E4,.577537E3,T)
      LGERR=Q(.504752E1,-.109335E3,.182691E4,-.340773E4,.168563E4,T)
      VNERR=Q(-.798305E-2,.646701E1,-.240102E2,.351633E2,-.176241E2,T)
      VEERR=Q(-.740555E-1,.140985E2,-.533356E2,.794973E2,-.404664E2,T)
      GO TO 300
230 IF(TDIF .GT. 13.00) GO TO 240
C**==> THIS IS ERROR DATA BETWEEN 11 AND 13 HOURS
      LTERR=Q(-.196154E1,.832318E2,.121998E4,-.251663E4,.120790E4,T)
      LGERR=Q(-.128723E2,.528756E3,-.563005E3,.169304E3,-.136860E3,T)
      VNERR=Q(-.137067,.124627E2,-.464115E2,.662067E2,-.320744E2,T)
      VEERR=Q(.305289,.113129E2,-.340711E2,.418276E2,-.187287E2,T)
      GO TO 300
240 IF(TDIF .GT. 25.00) GO TO 250
C**==> THIS IS ERROR DATA BETWEEN 23 AND 25 HOURS
      LTERR=Q(-.527531E2,.194688E4,-.397901E4,.326826E4,-.120623E4,T)
      LGERR=Q(.209375E2,.402766E3,.411796E4,-.889242E4,.435372E4,T)
      VNERR=Q(.626779,.812293E1,-.279371E2,.367508E2,-.172505E2,T)
      VEERR=Q(.728756,.208960E2,-.899374E2,.136860E3,-.682694E2,T)
      GO TO 300
250 IF(TDIF .GT. 50.00) GO TO 260
C**==> THIS IS ERROR DATA BETWEEN 47 AND 49 HOURS
      LTERR=Q(-.154057E3,.517674E4,-.147802E5,.142932E5,-.858630E4,T)
      LGERR=Q(.608849E1,.148236E4,.770615E4,-.178465E5,.845979E4,T)
      VNERR=Q(.619958,.843798E1,-.265352E2,.351965E2,-.165618E2,T)
      VEERR=Q(.110754E1,.976905E1,-.314405E2,.435897E2,-.216462E2,T)
      GO TO 300
C**==> NO DATA FOR TDIF GREATER THAN 50 HOURS, SET TO DEFAULT
260 VEERR= 9999.9
      VNERR= 9999.9
      LGERR= 9999.9
      LTERR= 9999.9
C**
C** IF THE ERROR ESTIMATE EQUATIONS PROVIDE NEGATIVE VALUES SET THEM
C** TO ZERO
C**
300 IF(LTERR .LT. 0.0) LTERR = 0.0
      IF(LGERR .LT. 0.0) LGERR = 0.0
      IF(VNERR .LT. 0.0) VNERR = 0.0
      IF(VEERR .LT. 0.0) VEERR = 0.0
D
      TYPE 320, LTERR, LGERR, VNERR, VEERR
J 320 FORMAT(2X, 'LT/LG/VN//VE ERR==> ', 4F10.4)
C**
C** THATS ALL FOLKS
C**
      RETURN
      END

```

APPENDIX 3

CONVERSION TABLE FOR AIDJEX DAYS TO CALENDAR DAYS

For the main experiment, AIDJEX adopted a convention of numbering days consecutively, beginning with day 1 = 01 January, 1975 and ending with day 500 = 14 May, 1976.

In the conversion table, the first column is the AIDJEX day, the second is the corresponding day of 1975 or 1976 and the third entry is the calendar date.

[illegible]

REFERENCES

- Bauer, E., Hunkins, K., Manley, T.O., and Tiemann, W., 1980. Arctic Ice Dynamics Joint Experiment 1975-1976, Physical Oceanography Data Report, STD Data - Camp Caribou, Volume 1. CU-8-80. Tech. Rpt. No. 8, Lamont-Doherty Geological Observatory of Columbia University, Palisades, N.Y.
- Bauer, E., Hunkins, K., Manley, T.O., and Tiemann, W., 1980. Arctic Ice Dynamics Joint Experiment 1975-1976, Physical Oceanography Data Report, STD Data - Camp Blue Fox, Volume 2. CU-9-80. Tech. Rpt. No. 9, Lamont-Doherty Geological Observatory of Columbia University, Palisades, N.Y.
- Bauer, E., Hunkins, K., Manley, T.O., and Tiemann, W., 1980. Arctic Ice Dynamics Joint Experiment 1975-1976, Physical Oceanography Data Report, STD Data - Camp Snowbird, Volume 3. CU-10-80. Tech. Rpt. No. 10, Lamont-Doherty Geological Observatory of Columbia University, Palisades, N.Y.
- Bauer, E., Hunkins, K., Manley, T.O., and Tiemann, W., 1980. Arctic Ice Dynamics Joint Experiment 1975-1976, Physical Oceanography Data Report, STD Data - Camp Big Bear, Volume 4. CU-11-80. Tech. Rpt. No. 11, Lamont-Doherty Geological Observatory of Columbia University, Palisades, N.Y.
- Hunkins, K., 1974. Subsurface eddies in the Arctic Ocean. Deep Sea Res. 21, 1017-1033.
- Manley, T.O., Hunkins, K., and Tiemann, W., 1980. Arctic Ice Dynamics Joint Experiment 1975-1976, Physical Oceanography Data Report, Profiling Current Meter Data - Camp Caribou, Volume 1. CU-4-80. Tech. Rpt. No. 4, Lamont-Doherty Geological Observatory of Columbia University, Palisades, N.Y.

Manley, T.O., Hunkins, K., and Tiemann, W., 1980. Arctic Ice Dynamics Joint Experiment 1975-1976, Physical Oceanography Data Report, Profiling Current Meter Data - Camp Blue Fox, Volume 2. CU-5-80. Tech. Rpt. No. 5, Lamont-Doherty Geological Observatory of Columbia University, Palisades, N.Y.

Manley, T.O., Hunkins, K., and Tiemann, W., 1980. Arctic Ice Dynamics Joint Experiment 1975-1976, Physical Oceanography Data Report, Profiling Current Meter Data - Camp Big Bear, Volume 4. CU-7-80. Tech. Rpt. No. 7, Lamont-Doherty Geological Observatory of Columbia University, Palisades, N.Y.

Newton, J.L., K. Aagaard, and L.K. Coachman, 1974. Baroclinic eddies in the Arctic Ocean. Deep Sea Res. 21, 707-719.

Thorndike, A.S., and Cheung, J.Y., 1977. AIDJEX Measurements of Sea Ice Motion, 11 April 1975 to 14 May 1976. AIDJEX Bull. Vol. 35, 149 pp.

Thorndike, A.S. and Manley, T.O., 1980. Updated Position and Ice Velocities Measurements for the AIDJEX Manned Camps, Volume 1, 11 April 1975 to 17 October 1975. CU-2-80. Tech. Rpt. No. 2, Lamont-Doherty Geological Observatory of Columbia University, Palisades, N.Y.

Thorndike, A.S. and Manley, T.O., 1980. Updated Position and Ice Velocities Measurements for the AIDJEX Manned Camps, Volume 2, 18 October 1975 to 4 May 1976. CU-3-80. Tech. Rpt. No. 3. Lamont-Doherty Geological Observatory of Columbia University, Palisades, N.Y.

_____, 1976. Ocean Current Velocities at 2 and 38 m. AIDJEX Bull. Vol. 32, 59-64.

RESULTS

The following section of the data report provides all of the absolute velocity PCM data taken at camp Snowbird during the 1975-76 Arctic Ice Dynamics Joint Experiment. Numerical listings and corresponding plots of the data are given.

PCM STATION LISTINGS

The station listing shows all stations taken at the camp along with other pertinent information. Stations that have been digitized are indicated by the word "PLOT", stations that are listed with "TSER" ("time series" or " ") were not digitized primarily due to lack of relative speeds. Parameters at the top of each page imply the following:

CAMP	Name of manned camp
STAT	PCM station
CODE	Processing code, see above
DY	day
MON	month
YR	year
TIME	GMT time of station
AJXDAY	AIDJEX day (decimal) of station, see Appendix 3
DEPTH	maximum depth (meters) obtained at station
N. VEL	north component of ice velocity (+ implies North, - implies South)
E. VEL	east component of ice velocity (+ implies East, - implies West)
LATITUDE	latitude of station in decimal degrees
LONGITUDE	longitude of station in decimal degrees (~ implies West longitude)
LT. ERR	error of latitude position in meters
LG. ERR	error of longitude position in meters
VN. ERR	error in north component of ice velocity in cm/sec
VE. ERR	error in east component of ice velocity in cm/sec

CAMP	STAT CODE	BY	MM	YY	TIME	AUXDAY	DEPTH	N VEL	E VEL	LATITUDE	LONGITUDE	LAT ERR	LONG ERR	NV. ERR	EV. ERR
SHRUBBL	1	4	5	75	1743	124	2581	0	44	75	146	75000	40000	0	1
SHRUBBL	2	5	75	1743	125	125	2582	0	44	76	147	00000	00000	0	1
SHRUBBL	3	6	75	1743	126	126	2583	0	44	76	147	00000	00000	0	1
SHRUBBL	4	7	75	1743	127	127	2584	0	44	76	147	00000	00000	0	1
SHRUBBL	5	8	75	1743	128	128	2585	0	44	76	147	00000	00000	0	1
SHRUBBL	6	9	75	1743	129	129	2586	0	44	76	147	00000	00000	0	1
SHRUBBL	7	10	75	1743	130	130	2587	0	44	76	147	00000	00000	0	1
SHRUBBL	8	11	75	1743	131	131	2588	0	44	76	147	00000	00000	0	1
SHRUBBL	9	12	75	1743	132	132	2589	0	44	76	147	00000	00000	0	1
SHRUBBL	10	13	75	1743	133	133	2590	0	44	76	147	00000	00000	0	1
SHRUBBL	11	14	75	1743	134	134	2591	0	44	76	147	00000	00000	0	1
SHRUBBL	12	15	75	1743	135	135	2592	0	44	76	147	00000	00000	0	1
SHRUBBL	13	16	75	1743	136	136	2593	0	44	76	147	00000	00000	0	1
SHRUBBL	14	17	75	1743	137	137	2594	0	44	76	147	00000	00000	0	1
SHRUBBL	15	18	75	1743	138	138	2595	0	44	76	147	00000	00000	0	1
SHRUBBL	16	19	75	1743	139	139	2596	0	44	76	147	00000	00000	0	1
SHRUBBL	17	20	75	1743	140	140	2597	0	44	76	147	00000	00000	0	1
SHRUBBL	18	21	75	1743	141	141	2598	0	44	76	147	00000	00000	0	1
SHRUBBL	19	22	75	1743	142	142	2599	0	44	76	147	00000	00000	0	1
SHRUBBL	20	23	75	1743	143	143	2600	0	44	76	147	00000	00000	0	1
SHRUBBL	21	24	75	1743	144	144	2601	0	44	76	147	00000	00000	0	1
SHRUBBL	22	25	75	1743	145	145	2602	0	44	76	147	00000	00000	0	1
SHRUBBL	23	26	75	1743	146	146	2603	0	44	76	147	00000	00000	0	1
SHRUBBL	24	27	75	1743	147	147	2604	0	44	76	147	00000	00000	0	1
SHRUBBL	25	28	75	1743	148	148	2605	0	44	76	147	00000	00000	0	1
SHRUBBL	26	29	75	1743	149	149	2606	0	44	76	147	00000	00000	0	1
SHRUBBL	27	30	75	1743	150	150	2607	0	44	76	147	00000	00000	0	1
SHRUBBL	28	31	75	1743	151	151	2608	0	44	76	147	00000	00000	0	1
SHRUBBL	29	32	75	1743	152	152	2609	0	44	76	147	00000	00000	0	1
SHRUBBL	30	33	75	1743	153	153	2610	0	44	76	147	00000	00000	0	1
SHRUBBL	31	34	75	1743	154	154	2611	0	44	76	147	00000	00000	0	1
SHRUBBL	32	35	75	1743	155	155	2612	0	44	76	147	00000	00000	0	1
SHRUBBL	33	36	75	1743	156	156	2613	0	44	76	147	00000	00000	0	1
SHRUBBL	34	37	75	1743	157	157	2614	0	44	76	147	00000	00000	0	1
SHRUBBL	35	38	75	1743	158	158	2615	0	44	76	147	00000	00000	0	1
SHRUBBL	36	39	75	1743	159	159	2616	0	44	76	147	00000	00000	0	1
SHRUBBL	37	40	75	1743	160	160	2617	0	44	76	147	00000	00000	0	1
SHRUBBL	38	41	75	1743	161	161	2618	0	44	76	147	00000	00000	0	1
SHRUBBL	39	42	75	1743	162	162	2619	0	44	76	147	00000	00000	0	1
SHRUBBL	40	43	75	1743	163	163	2620	0	44	76	147	00000	00000	0	1
SHRUBBL	41	44	75	1743	164	164	2621	0	44	76	147	00000	00000	0	1
SHRUBBL	42	45	75	1743	165	165	2622	0	44	76	147	00000	00000	0	1
SHRUBBL	43	46	75	1743	166	166	2623	0	44	76	147	00000	00000	0	1
SHRUBBL	44	47	75	1743	167	167	2624	0	44	76	147	00000	00000	0	1
SHRUBBL	45	48	75	1743	168	168	2625	0	44	76	147	00000	00000	0	1
SHRUBBL	46	49	75	1743	169	169	2626	0	44	76	147	00000	00000	0	1
SHRUBBL	47	50	75	1743	170	170	2627	0	44	76	147	00000	00000	0	1
SHRUBBL	48	51	75	1743	171	171	2628	0	44	76	147	00000	00000	0	1
SHRUBBL	49	52	75	1743	172	172	2629	0	44	76	147	00000	00000	0	1
SHRUBBL	50	53	75	1743	173	173	2630	0	44	76	147	00000	00000	0	1
SHRUBBL	51	54	75	1743	174	174	2631	0	44	76	147	00000	00000	0	1
SHRUBBL	52	55	75	1743	175	175	2632	0	44	76	147	00000	00000	0	1
SHRUBBL	53	56	75	1743	176	176	2633	0	44	76	147	00000	00000	0	1
SHRUBBL	54	57	75	1743	177	177	2634	0	44	76	147	00000	00000	0	1
SHRUBBL	55	58	75	1743	178	178	2635	0	44	76	147	00000	00000	0	1
SHRUBBL	56	59	75	1743	179	179	2636	0	44	76	147	00000	00000	0	1
SHRUBBL	57	60	75	1743	180	180	2637	0	44	76	147	00000	00000	0	1
SHRUBBL	58	61	75	1743	181	181	2638	0	44	76	147	00000	00000	0	1
SHRUBBL	59	62	75	1743	182	182	2639	0	44	76	147	00000	00000	0	1
SHRUBBL	60	63	75	1743	183	183	2640	0	44	76	147	00000	00000	0	1
SHRUBBL	61	64	75	1743	184	184	2641	0	44	76	147	00000	00000	0	1
SHRUBBL	62	65	75	1743	185	185	2642	0	44	76	147	00000	00000	0	1
SHRUBBL	63	66	75	1743	186	186	2643	0	44	76	147	00000	00000	0	1
SHRUBBL	64	67	75	1743	187	187	2644	0	44	76	147	00000	00000	0	1
SHRUBBL	65	68	75	1743	188	188	2645	0	44	76	147	00000	00000	0	1
SHRUBBL	66	69	75	1743	189	189	2646	0	44	76	147	00000	00000	0	1
SHRUBBL	67	70	75	1743	190	190	2647	0	44	76	147	00000	00000	0	1
SHRUBBL	68	71	75	1743	191	191	2648	0	44	76	147	00000	00000	0	1
SHRUBBL	69	72	75	1743	192	192	2649	0	44	76	147	00000	00000	0	1
SHRUBBL	70	73	75	1743	193	193	2650	0	44	76	147	00000	00000	0	1

CAMP	STAT	CURL	DY	MON	YR	TIME	AUXDAY	DEPTH	N VEL	E VEL	LATITUDE	LONGITUDE	LAT ERR	LONG ERR	NV ERR	EV ERR
SHAMUARD	71		10	JUN	75	2043	161 9269	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	72		11	JUN	75	2044	162 9309	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	73		12	JUN	75	2045	163 9349	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	74		13	JUN	75	2046	164 9389	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	75		14	JUN	75	2047	165 9429	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	76		15	JUN	75	2048	166 9469	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	77		16	JUN	75	2049	167 9509	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	78		17	JUN	75	2050	168 9549	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	79		18	JUN	75	2051	169 9589	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	80		19	JUN	75	2052	170 9629	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	81		20	JUN	75	2053	171 9669	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	82		21	JUN	75	2054	172 9709	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	83		22	JUN	75	2055	173 9749	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	84		23	JUN	75	2056	174 9789	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	85		24	JUN	75	2057	175 9829	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	86		25	JUN	75	2058	176 9869	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	87		26	JUN	75	2059	177 9909	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	88		27	JUN	75	2060	178 9949	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	89		28	JUN	75	2061	179 9989	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	90		29	JUN	75	2062	180 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	91		30	JUN	75	2063	181 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	92		1	JUL	75	2064	182 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	93		2	JUL	75	2065	183 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	94		3	JUL	75	2066	184 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	95		4	JUL	75	2067	185 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	96		5	JUL	75	2068	186 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	97		6	JUL	75	2069	187 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	98		7	JUL	75	2070	188 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	99		8	JUL	75	2071	189 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	100		9	JUL	75	2072	190 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	101		10	JUL	75	2073	191 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	102		11	JUL	75	2074	192 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	103		12	JUL	75	2075	193 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	104		13	JUL	75	2076	194 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	105		14	JUL	75	2077	195 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	106		15	JUL	75	2078	196 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	107		16	JUL	75	2079	197 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	108		17	JUL	75	2080	198 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	109		18	JUL	75	2081	199 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	110		19	JUL	75	2082	200 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	111		20	JUL	75	2083	201 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	112		21	JUL	75	2084	202 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	113		22	JUL	75	2085	203 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	114		23	JUL	75	2086	204 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	115		24	JUL	75	2087	205 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	116		25	JUL	75	2088	206 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	117		26	JUL	75	2089	207 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	118		27	JUL	75	2090	208 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	119		28	JUL	75	2091	209 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	120		29	JUL	75	2092	210 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	121		30	JUL	75	2093	211 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	122		1	AUG	75	2094	212 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	123		2	AUG	75	2095	213 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	124		3	AUG	75	2096	214 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	125		4	AUG	75	2097	215 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	126		5	AUG	75	2098	216 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	127		6	AUG	75	2099	217 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	128		7	AUG	75	2100	218 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	129		8	AUG	75	2101	219 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	130		9	AUG	75	2102	220 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	131		10	AUG	75	2103	221 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	132		11	AUG	75	2104	222 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	133		12	AUG	75	2105	223 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	134		13	AUG	75	2106	224 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	135		14	AUG	75	2107	225 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	136		15	AUG	75	2108	226 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	137		16	AUG	75	2109	227 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	138		17	AUG	75	2110	228 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	139		18	AUG	75	2111	229 1000	199	2	1.27	76.30912	151.23352	0	0	0	0
SHAMUARD	140		19	AUG	75	2112	230 1000	199	2	1.27	76.30912	151.23352	0	0	0	0

CAMP	STAT CODE	BY	MON	YR	TIME	AJXDAY	DEPTH	N VEL	E VEL	LATITUDE	LONGITUDE	LAT ERR	LONG ERR	EV ERR
SNABIRD	281	SEP	75	543	268	190	15	4	3	74	0	1	1	1
SNABIRD	282	SEP	75	544	268	190	15	4	3	74	0	1	1	1
SNABIRD	283	SEP	75	545	270	190	15	4	3	74	0	1	1	1
SNABIRD	284	SEP	75	546	270	190	15	4	3	74	0	1	1	1
SNABIRD	285	SEP	75	547	271	190	15	4	3	74	0	1	1	1
SNABIRD	286	SEP	75	548	271	190	15	4	3	74	0	1	1	1
SNABIRD	287	SEP	75	549	272	190	15	4	3	74	0	1	1	1
SNABIRD	288	SEP	75	550	272	190	15	4	3	74	0	1	1	1
SNABIRD	289	SEP	75	551	273	190	15	4	3	74	0	1	1	1
SNABIRD	290	SEP	75	552	273	190	15	4	3	74	0	1	1	1
SNABIRD	291	SEP	75	553	274	190	15	4	3	74	0	1	1	1
SNABIRD	292	SEP	75	554	274	190	15	4	3	74	0	1	1	1
SNABIRD	293	SEP	75	555	275	190	15	4	3	74	0	1	1	1
SNABIRD	294	SEP	75	556	275	190	15	4	3	74	0	1	1	1
SNABIRD	295	SEP	75	557	276	190	15	4	3	74	0	1	1	1
SNABIRD	296	SEP	75	558	276	190	15	4	3	74	0	1	1	1
SNABIRD	297	SEP	75	559	277	190	15	4	3	74	0	1	1	1
SNABIRD	298	SEP	75	560	277	190	15	4	3	74	0	1	1	1
SNABIRD	299	SEP	75	561	278	200	15	4	3	74	0	1	1	1
SNABIRD	300	SEP	75	562	278	200	15	4	3	74	0	1	1	1
SNABIRD	301	SEP	75	563	280	200	15	4	3	74	0	1	1	1
SNABIRD	302	SEP	75	564	280	200	15	4	3	74	0	1	1	1
SNABIRD	303	SEP	75	565	281	200	15	4	3	74	0	1	1	1
SNABIRD	304	SEP	75	566	281	200	15	4	3	74	0	1	1	1
SNABIRD	305	SEP	75	567	282	200	15	4	3	74	0	1	1	1
SNABIRD	306	SEP	75	568	282	200	15	4	3	74	0	1	1	1
SNABIRD	307	SEP	75	569	283	200	15	4	3	74	0	1	1	1
SNABIRD	308	SEP	75	570	283	200	15	4	3	74	0	1	1	1
SNABIRD	309	SEP	75	571	284	200	15	4	3	74	0	1	1	1
SNABIRD	310	SEP	75	572	284	200	15	4	3	74	0	1	1	1
SNABIRD	311	SEP	75	573	285	200	15	4	3	74	0	1	1	1
SNABIRD	312	SEP	75	574	285	200	15	4	3	74	0	1	1	1
SNABIRD	313	SEP	75	575	286	200	15	4	3	74	0	1	1	1
SNABIRD	314	SEP	75	576	286	200	15	4	3	74	0	1	1	1
SNABIRD	315	SEP	75	577	287	200	15	4	3	74	0	1	1	1
SNABIRD	316	SEP	75	578	287	200	15	4	3	74	0	1	1	1
SNABIRD	317	SEP	75	579	288	200	15	4	3	74	0	1	1	1
SNABIRD	318	SEP	75	580	288	200	15	4	3	74	0	1	1	1
SNABIRD	319	SEP	75	581	289	200	15	4	3	74	0	1	1	1
SNABIRD	320	SEP	75	582	289	200	15	4	3	74	0	1	1	1
SNABIRD	321	SEP	75	583	290	200	15	4	3	74	0	1	1	1
SNABIRD	322	SEP	75	584	290	200	15	4	3	74	0	1	1	1
SNABIRD	323	SEP	75	585	291	200	15	4	3	74	0	1	1	1
SNABIRD	324	SEP	75	586	291	200	15	4	3	74	0	1	1	1
SNABIRD	325	SEP	75	587	292	200	15	4	3	74	0	1	1	1
SNABIRD	326	SEP	75	588	292	200	15	4	3	74	0	1	1	1
SNABIRD	327	SEP	75	589	293	200	15	4	3	74	0	1	1	1
SNABIRD	328	SEP	75	590	293	200	15	4	3	74	0	1	1	1
SNABIRD	329	SEP	75	591	294	200	15	4	3	74	0	1	1	1
SNABIRD	330	SEP	75	592	294	200	15	4	3	74	0	1	1	1
SNABIRD	331	SEP	75	593	295	200	15	4	3	74	0	1	1	1
SNABIRD	332	SEP	75	594	295	200	15	4	3	74	0	1	1	1
SNABIRD	333	SEP	75	595	296	200	15	4	3	74	0	1	1	1
SNABIRD	334	SEP	75	596	296	200	15	4	3	74	0	1	1	1
SNABIRD	335	SEP	75	597	297	200	15	4	3	74	0	1	1	1
SNABIRD	336	SEP	75	598	297	200	15	4	3	74	0	1	1	1
SNABIRD	337	SEP	75	599	298	200	15	4	3	74	0	1	1	1
SNABIRD	338	SEP	75	600	298	200	15	4	3	74	0	1	1	1
SNABIRD	339	SEP	75	601	299	200	15	4	3	74	0	1	1	1
SNABIRD	340	SEP	75	602	299	200	15	4	3	74	0	1	1	1
SNABIRD	341	SEP	75	603	300	200	15	4	3	74	0	1	1	1
SNABIRD	342	SEP	75	604	300	200	15	4	3	74	0	1	1	1
SNABIRD	343	SEP	75	605	301	200	15	4	3	74	0	1	1	1
SNABIRD	344	SEP	75	606	301	200	15	4	3	74	0	1	1	1
SNABIRD	345	SEP	75	607	302	200	15	4	3	74	0	1	1	1
SNABIRD	346	SEP	75	608	302	200	15	4	3	74	0	1	1	1
SNABIRD	347	SEP	75	609	303	200	15	4	3	74	0	1	1	1
SNABIRD	348	SEP	75	610	303	200	15	4	3	74	0	1	1	1
SNABIRD	349	SEP	75	611	304	200	15	4	3	74	0	1	1	1
SNABIRD	350	SEP	75	612	304	200	15	4	3	74	0	1	1	1

CANP	STAT	CUDL	BY	MON	YR	TIME	AJDAY	DEPTH	N VEL	E VEL	LATITUDE	LONGITUDE	LAT	ERR	LN	ENR	INV	ERR	EV	ERR
SNRMBIRD	421	PL01	13	DEC	75	2:31	347 7749	200	4.2	-12.3	73 04474	-144 66011	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	422	PL01	14	DEC	75	2:31	348 7749	200	4.3	-12.3	73 05057	-144 75797	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	423	PL01	15	DEC	75	2:31	349 7749	200	4.4	-12.3	73 05710	-144 86309	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	424	PL01	16	DEC	75	2:31	350 7749	200	4.5	-12.3	73 06363	-144 97021	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	425	PL01	17	DEC	75	2:31	351 7749	200	4.6	-12.3	73 07016	-145 07733	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	426	PL01	18	DEC	75	2:31	352 7749	200	4.7	-12.3	73 07669	-145 18445	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	427	PL01	19	DEC	75	2:31	353 7749	200	4.8	-12.3	73 08322	-145 29157	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	428	PL01	20	DEC	75	2:31	354 7749	200	4.9	-12.3	73 08975	-145 39869	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	429	PL01	21	DEC	75	2:31	355 7749	200	5.0	-12.3	73 09628	-145 50581	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	430	PL01	22	DEC	75	2:31	356 7749	200	5.1	-12.3	73 10281	-145 61293	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	431	PL01	23	DEC	75	2:31	357 7749	200	5.2	-12.3	73 10934	-145 72005	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	432	PL01	24	DEC	75	2:31	358 7749	200	5.3	-12.3	73 11587	-145 82717	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	433	PL01	25	DEC	75	2:31	359 7749	200	5.4	-12.3	73 12240	-145 93429	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	434	PL01	26	DEC	75	2:31	360 7749	200	5.5	-12.3	73 12893	-146 04141	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	435	PL01	27	DEC	75	2:31	361 7749	200	5.6	-12.3	73 13546	-146 14853	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	436	PL01	28	DEC	75	2:31	362 7749	200	5.7	-12.3	73 14199	-146 25565	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	437	PL01	29	DEC	75	2:31	363 7749	200	5.8	-12.3	73 14852	-146 36277	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	438	PL01	30	DEC	75	2:31	364 7749	200	5.9	-12.3	73 15505	-146 46989	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	439	PL01	31	DEC	75	2:31	365 7749	200	6.0	-12.3	73 16158	-146 57701	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	440	PL01	1	JAN	76	2:31	366 7749	200	6.1	-12.3	73 16811	-146 68413	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	441	PL01	2	JAN	76	2:31	367 7749	200	6.2	-12.3	73 17464	-146 79125	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	442	PL01	3	JAN	76	2:31	368 7749	200	6.3	-12.3	73 18117	-146 89837	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	443	PL01	4	JAN	76	2:31	369 7749	200	6.4	-12.3	73 18770	-147 00549	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	444	PL01	5	JAN	76	2:31	370 7749	200	6.5	-12.3	73 19423	-147 11261	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	445	PL01	6	JAN	76	2:31	371 7749	200	6.6	-12.3	73 20076	-147 21973	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	446	PL01	7	JAN	76	2:31	372 7749	200	6.7	-12.3	73 20729	-147 32685	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	447	PL01	8	JAN	76	2:31	373 7749	200	6.8	-12.3	73 21382	-147 43397	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	448	PL01	9	JAN	76	2:31	374 7749	200	6.9	-12.3	73 22035	-147 54109	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	449	PL01	10	JAN	76	2:31	375 7749	200	7.0	-12.3	73 22688	-147 64821	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	450	PL01	11	JAN	76	2:31	376 7749	200	7.1	-12.3	73 23341	-147 75533	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	451	PL01	12	JAN	76	2:31	377 7749	200	7.2	-12.3	73 23994	-147 86245	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	452	PL01	13	JAN	76	2:31	378 7749	200	7.3	-12.3	73 24647	-147 96957	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	453	PL01	14	JAN	76	2:31	379 7749	200	7.4	-12.3	73 25300	-148 07669	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	454	PL01	15	JAN	76	2:31	380 7749	200	7.5	-12.3	73 25953	-148 18381	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	455	PL01	16	JAN	76	2:31	381 7749	200	7.6	-12.3	73 26606	-148 29093	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	456	PL01	17	JAN	76	2:31	382 7749	200	7.7	-12.3	73 27259	-148 39805	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	457	PL01	18	JAN	76	2:31	383 7749	200	7.8	-12.3	73 27912	-148 50517	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	458	PL01	19	JAN	76	2:31	384 7749	200	7.9	-12.3	73 28565	-148 61229	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	459	PL01	20	JAN	76	2:31	385 7749	200	8.0	-12.3	73 29218	-148 71941	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	460	PL01	21	JAN	76	2:31	386 7749	200	8.1	-12.3	73 29871	-148 82653	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	461	PL01	22	JAN	76	2:31	387 7749	200	8.2	-12.3	73 30524	-148 93365	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	462	PL01	23	JAN	76	2:31	388 7749	200	8.3	-12.3	73 31177	-149 04077	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	463	PL01	24	JAN	76	2:31	389 7749	200	8.4	-12.3	73 31830	-149 14789	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	464	PL01	25	JAN	76	2:31	390 7749	200	8.5	-12.3	73 32483	-149 25501	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	465	PL01	26	JAN	76	2:31	391 7749	200	8.6	-12.3	73 33136	-149 36213	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	466	PL01	27	JAN	76	2:31	392 7749	200	8.7	-12.3	73 33789	-149 46925	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	467	PL01	28	JAN	76	2:31	393 7749	200	8.8	-12.3	73 34442	-149 57637	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	468	PL01	29	JAN	76	2:31	394 7749	200	8.9	-12.3	73 35095	-149 68349	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	469	PL01	30	JAN	76	2:31	395 7749	200	9.0	-12.3	73 35748	-149 79061	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	470	PL01	31	JAN	76	2:31	396 7749	200	9.1	-12.3	73 36401	-149 89773	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	471	PL01	1	FEB	76	2:31	397 7749	200	9.2	-12.3	73 37054	-149 00485	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	472	PL01	2	FEB	76	2:31	398 7749	200	9.3	-12.3	73 37707	-149 11197	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	473	PL01	3	FEB	76	2:31	399 7749	200	9.4	-12.3	73 38360	-149 21909	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	474	PL01	4	FEB	76	2:31	400 7749	200	9.5	-12.3	73 39013	-149 32621	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	475	PL01	5	FEB	76	2:31	401 7749	200	9.6	-12.3	73 39666	-149 43333	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	476	PL01	6	FEB	76	2:31	402 7749	200	9.7	-12.3	73 40319	-149 54045	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	477	PL01	7	FEB	76	2:31	403 7749	200	9.8	-12.3	73 40972	-149 64757	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	478	PL01	8	FEB	76	2:31	404 7749	200	9.9	-12.3	73 41625	-149 75469	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	479	PL01	9	FEB	76	2:31	405 7749	200	10.0	-12.3	73 42278	-149 86181	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	480	PL01	10	FEB	76	2:31	406 7749	200	10.1	-12.3	73 42931	-149 96893	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	481	PL01	11	FEB	76	2:31	407 7749	200	10.2	-12.3	73 43584	-150 07605	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	482	PL01	12	FEB	76	2:31	408 7749	200	10.3	-12.3	73 44237	-150 18317	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	483	PL01	13	FEB	76	2:31	409 7749	200	10.4	-12.3	73 44890	-150 29029	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	484	PL01	14	FEB	76	2:31	410 7749	200	10.5	-12.3	73 45543	-150 39741	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	485	PL01	15	FEB	76	2:31	411 7749	200	10.6	-12.3	73 46196	-150 50453	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	486	PL01	16	FEB	76	2:31	412 7749	200	10.7	-12.3	73 46849	-150 61165	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	487	PL01	17	FEB	76	2:31	413 7749	200	10.8	-12.3	73 47502	-150 71877	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	488	PL01	18	FEB	76	2:31	414 7749	200	10.9	-12.3	73 48155	-150 82589	48 7	0.0	22	4	0	0	1	5
SNRMBIRD	489	PL01	19	FEB	76	2:31	415 7749	200	11.0</											

CAMP	STAT	CODE	BY	MO	YR	TIME	ADJAY	DEPTH	N VEL	E VEL	LATITUDE	LONGITUDE	LAT ERR	LONG ERR	INV LMR	EV ERR
SHRUB IND	491		25	JAN	76	1053	390	8/01	1	1	73	00902	1	0	0	1
SHRUB IND	492		26	JAN	76	2034	391	8/05	0	1	73	01085	0	0	0	1
SHRUB IND	493		27	JAN	76	2034	392	8/05	0	1	73	01189	0	0	0	1
SHRUB IND	494		27	JAN	76	2034	392	8/05	0	1	73	01341	0	0	0	1
SHRUB IND	495		27	JAN	76	1950	392	8/06	0	1	73	01472	0	0	0	1
SHRUB IND	496		28	JAN	76	2011	393	8/10	0	1	73	01584	0	0	0	1
SHRUB IND	497		28	JAN	76	2011	393	8/10	0	1	73	01737	0	0	0	1
SHRUB IND	498		29	JAN	76	2037	394	8/05	0	1	73	01894	0	0	0	1
SHRUB IND	499		30	JAN	76	2037	394	8/05	0	1	73	02047	0	0	0	1
SHRUB IND	500		30	JAN	76	2037	394	8/05	0	1	73	02200	0	0	0	1
SHRUB IND	501	PLOT	31	JAN	76	1500	395	2000	0	1	73	02353	0	0	0	1
SHRUB IND	502	PLOT	31	JAN	76	1500	395	2000	0	1	73	02506	0	0	0	1
SHRUB IND	503	PLOT	31	JAN	76	1500	395	2000	0	1	73	02659	0	0	0	1
SHRUB IND	504	PLOT	31	JAN	76	1500	395	2000	0	1	73	02812	0	0	0	1
SHRUB IND	505	PLOT	31	JAN	76	1500	395	2000	0	1	73	02965	0	0	0	1
SHRUB IND	506	PLOT	31	JAN	76	1500	395	2000	0	1	73	03118	0	0	0	1
SHRUB IND	507	PLOT	31	JAN	76	1500	395	2000	0	1	73	03271	0	0	0	1
SHRUB IND	508	PLOT	31	JAN	76	1500	395	2000	0	1	73	03424	0	0	0	1
SHRUB IND	509	PLOT	31	JAN	76	1500	395	2000	0	1	73	03577	0	0	0	1
SHRUB IND	510	PLOT	31	JAN	76	1500	395	2000	0	1	73	03730	0	0	0	1
SHRUB IND	511	PLOT	31	JAN	76	1500	395	2000	0	1	73	03883	0	0	0	1
SHRUB IND	512	PLOT	31	JAN	76	1500	395	2000	0	1	73	04036	0	0	0	1
SHRUB IND	513	PLOT	31	JAN	76	1500	395	2000	0	1	73	04189	0	0	0	1
SHRUB IND	514	PLOT	31	JAN	76	1500	395	2000	0	1	73	04342	0	0	0	1
SHRUB IND	515	PLOT	31	JAN	76	1500	395	2000	0	1	73	04495	0	0	0	1
SHRUB IND	516	PLOT	31	JAN	76	1500	395	2000	0	1	73	04648	0	0	0	1
SHRUB IND	517	PLOT	31	JAN	76	1500	395	2000	0	1	73	04801	0	0	0	1
SHRUB IND	518	PLOT	31	JAN	76	1500	395	2000	0	1	73	04954	0	0	0	1
SHRUB IND	519	PLOT	31	JAN	76	1500	395	2000	0	1	73	05107	0	0	0	1
SHRUB IND	520	PLOT	31	JAN	76	1500	395	2000	0	1	73	05260	0	0	0	1
SHRUB IND	521	PLOT	31	JAN	76	1500	395	2000	0	1	73	05413	0	0	0	1
SHRUB IND	522	PLOT	31	JAN	76	1500	395	2000	0	1	73	05566	0	0	0	1
SHRUB IND	523	PLOT	31	JAN	76	1500	395	2000	0	1	73	05719	0	0	0	1
SHRUB IND	524	PLOT	31	JAN	76	1500	395	2000	0	1	73	05872	0	0	0	1
SHRUB IND	525	PLOT	31	JAN	76	1500	395	2000	0	1	73	06025	0	0	0	1
SHRUB IND	526	PLOT	31	JAN	76	1500	395	2000	0	1	73	06178	0	0	0	1
SHRUB IND	527	PLOT	31	JAN	76	1500	395	2000	0	1	73	06331	0	0	0	1
SHRUB IND	528	PLOT	31	JAN	76	1500	395	2000	0	1	73	06484	0	0	0	1
SHRUB IND	529	PLOT	31	JAN	76	1500	395	2000	0	1	73	06637	0	0	0	1
SHRUB IND	530	PLOT	31	JAN	76	1500	395	2000	0	1	73	06790	0	0	0	1
SHRUB IND	531	PLOT	31	JAN	76	1500	395	2000	0	1	73	06943	0	0	0	1
SHRUB IND	532	PLOT	31	JAN	76	1500	395	2000	0	1	73	07096	0	0	0	1
SHRUB IND	533	PLOT	31	JAN	76	1500	395	2000	0	1	73	07249	0	0	0	1
SHRUB IND	534	PLOT	31	JAN	76	1500	395	2000	0	1	73	07402	0	0	0	1
SHRUB IND	535	PLOT	31	JAN	76	1500	395	2000	0	1	73	07555	0	0	0	1
SHRUB IND	536	PLOT	31	JAN	76	1500	395	2000	0	1	73	07708	0	0	0	1
SHRUB IND	537	PLOT	31	JAN	76	1500	395	2000	0	1	73	07861	0	0	0	1
SHRUB IND	538	PLOT	31	JAN	76	1500	395	2000	0	1	73	08014	0	0	0	1
SHRUB IND	539	PLOT	31	JAN	76	1500	395	2000	0	1	73	08167	0	0	0	1
SHRUB IND	540	PLOT	31	JAN	76	1500	395	2000	0	1	73	08320	0	0	0	1
SHRUB IND	541	PLOT	31	JAN	76	1500	395	2000	0	1	73	08473	0	0	0	1
SHRUB IND	542	PLOT	31	JAN	76	1500	395	2000	0	1	73	08626	0	0	0	1
SHRUB IND	543	PLOT	31	JAN	76	1500	395	2000	0	1	73	08779	0	0	0	1
SHRUB IND	544	PLOT	31	JAN	76	1500	395	2000	0	1	73	08932	0	0	0	1
SHRUB IND	545	PLOT	31	JAN	76	1500	395	2000	0	1	73	09085	0	0	0	1
SHRUB IND	546	PLOT	31	JAN	76	1500	395	2000	0	1	73	09238	0	0	0	1
SHRUB IND	547	PLOT	31	JAN	76	1500	395	2000	0	1	73	09391	0	0	0	1
SHRUB IND	548	PLOT	31	JAN	76	1500	395	2000	0	1	73	09544	0	0	0	1
SHRUB IND	549	PLOT	31	JAN	76	1500	395	2000	0	1	73	09697	0	0	0	1
SHRUB IND	550	PLOT	31	JAN	76	1500	395	2000	0	1	73	09850	0	0	0	1
SHRUB IND	551	PLOT	31	JAN	76	1500	395	2000	0	1	73	10003	0	0	0	1
SHRUB IND	552	PLOT	31	JAN	76	1500	395	2000	0	1	73	10156	0	0	0	1
SHRUB IND	553	PLOT	31	JAN	76	1500	395	2000	0	1	73	10309	0	0	0	1
SHRUB IND	554	PLOT	31	JAN	76	1500	395	2000	0	1	73	10462	0	0	0	1
SHRUB IND	555	PLOT	31	JAN	76	1500	395	2000	0	1	73	10615	0	0	0	1
SHRUB IND	556	PLOT	31	JAN	76	1500	395	2000	0	1	73	10768	0	0	0	1
SHRUB IND	557	PLOT	31	JAN	76	1500	395	2000	0	1	73	10921	0	0	0	1
SHRUB IND	558	PLOT	31	JAN	76	1500	395	2000	0	1	73	11074	0	0	0	1
SHRUB IND	559	PLOT	31	JAN	76	1500	395	2000	0	1	73	11227	0	0	0	1
SHRUB IND	560	PLOT	31	JAN	76	1500	395	2000	0	1	73	11380	0	0	0	1

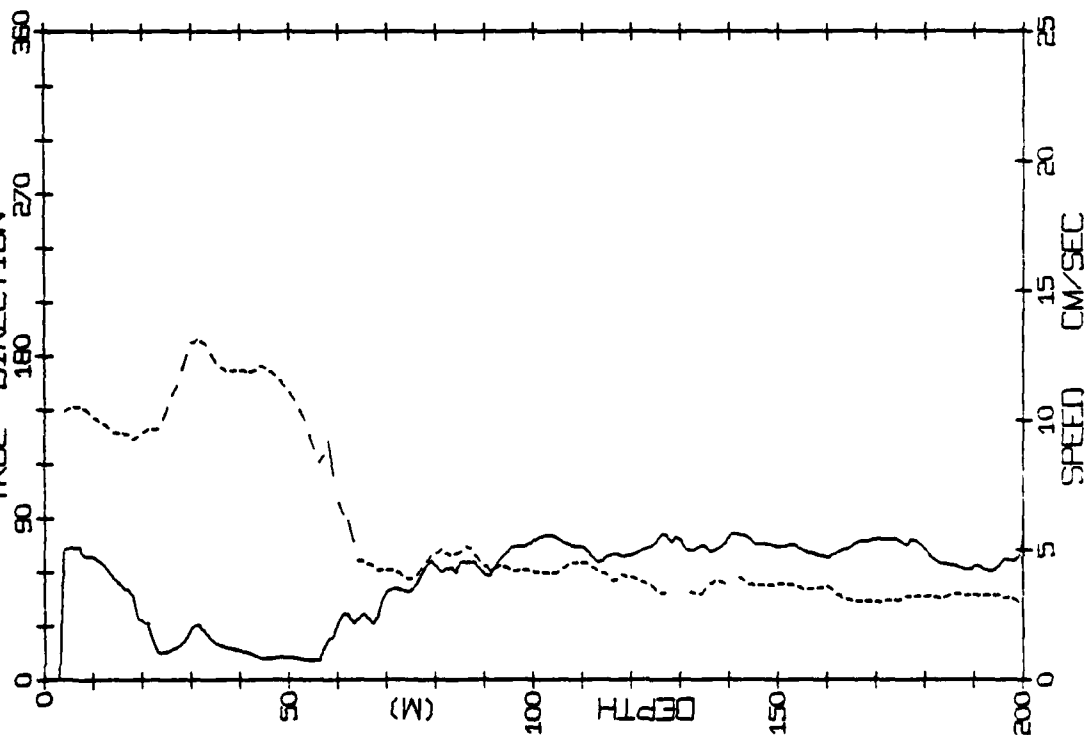
CAMP	STAT CODE	BY	MUN	YR	TIME	AJALAY	DEPTH	N. VEL	E. VEL	LATITUDE	LONGITUDE	LAT ERR	LNQ ERR	INV ERR	EV ERR
SHINBIRD	561	1	MAR	76	2011	437	200	0	1	36774	38471	0	0	0	0
SHINBIRD	562	2	MAR	76	1654	450	200	2	2	36814	38599	0	0	0	0
SHINBIRD	563	3	MAR	76	1730	450	200	2	2	36814	38599	0	0	0	0
SHINBIRD	564	4	MAR	76	2030	451	200	2	2	36814	38599	0	0	0	0
SHINBIRD	565	5	MAR	76	2030	451	200	2	2	36814	38599	0	0	0	0
SHINBIRD	566	6	MAR	76	2140	452	200	2	2	36814	38599	0	0	0	0
SHINBIRD	567	7	MAR	76	2140	452	200	2	2	36814	38599	0	0	0	0
SHINBIRD	568	8	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	569	9	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	570	10	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	571	11	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	572	12	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	573	13	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	574	14	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	575	15	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	576	16	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	577	17	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	578	18	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	579	19	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	580	20	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	581	21	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	582	22	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	583	23	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	584	24	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	585	25	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	586	26	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	587	27	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	588	28	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	589	29	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	590	30	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	591	31	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	592	32	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	593	33	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	594	34	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	595	35	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	596	36	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	597	37	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	598	38	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	599	39	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	600	40	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	601	41	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	602	42	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	603	43	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	604	44	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	605	45	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	606	46	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	607	47	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	608	48	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	609	49	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	610	50	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	611	51	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	612	52	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	613	53	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	614	54	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	615	55	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	616	56	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	617	57	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	618	58	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	619	59	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0
SHINBIRD	620	60	MAR	76	1928	453	200	2	2	36814	38599	0	0	0	0

This page intentionally left blank

CAMP SNOWBIRD
DATE 11/ 5/75

STATION 13
TIME 558(GMT)

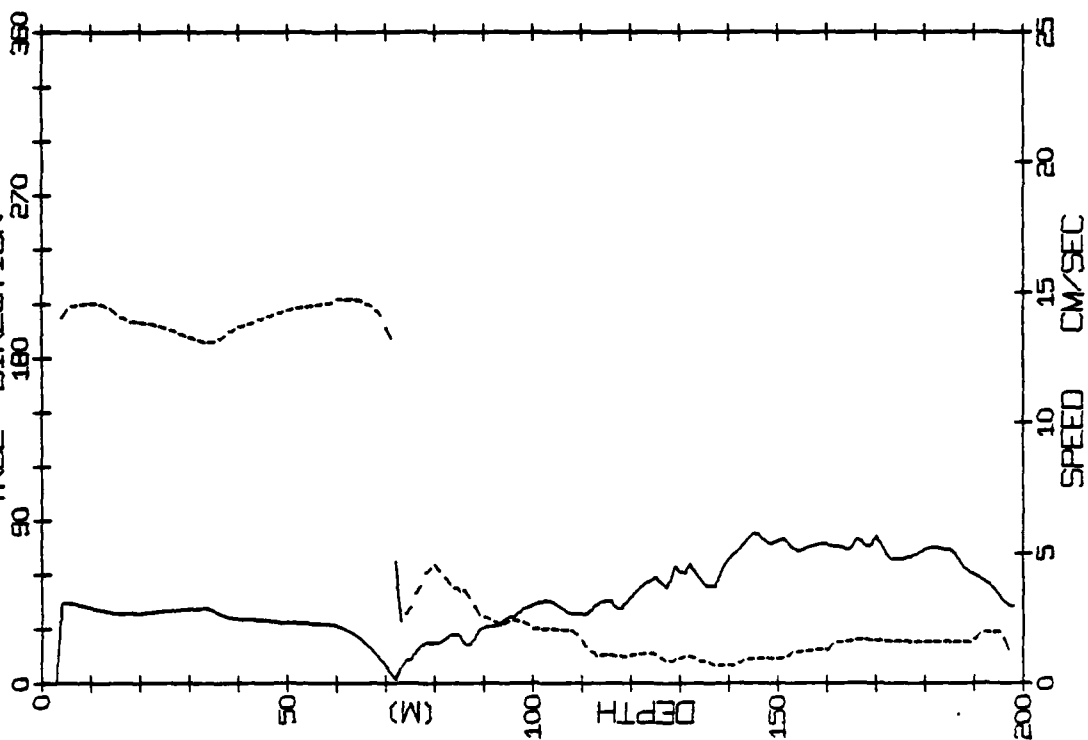
TRUE DIRECTION

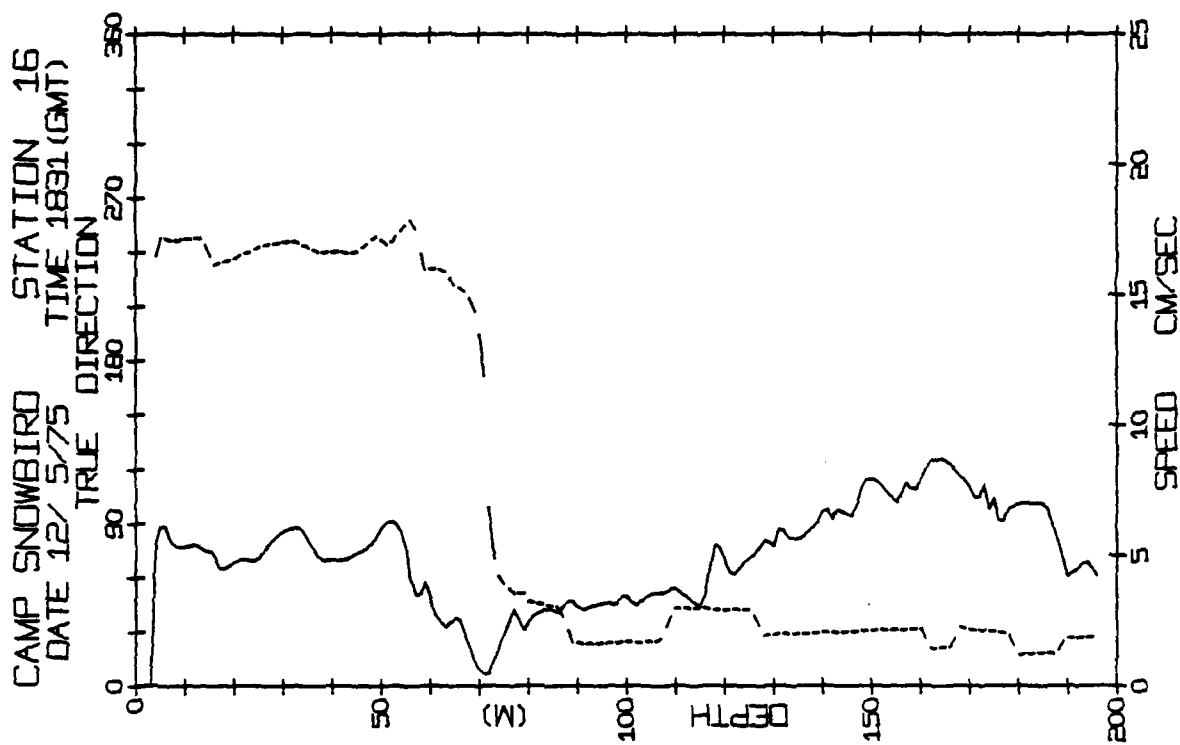
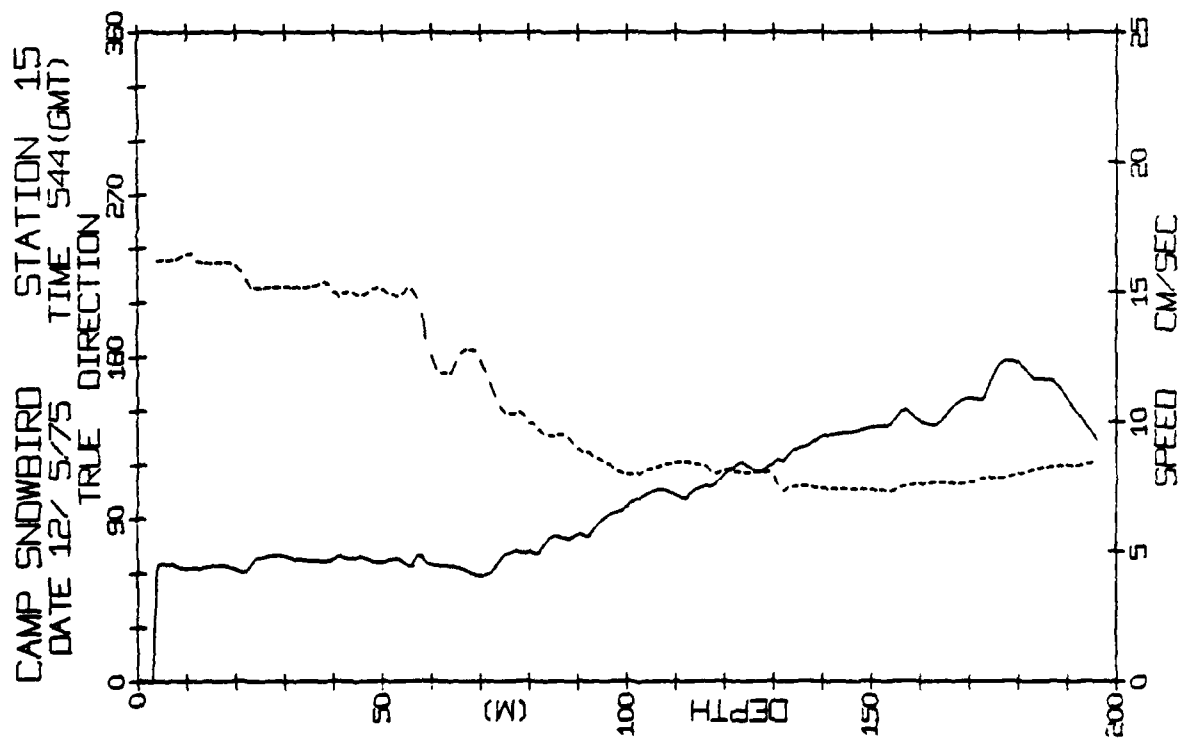


CAMP SNOWBIRD
DATE 11/ 5/75

STATION 14
TIME 1807(GMT)

TRUE DIRECTION

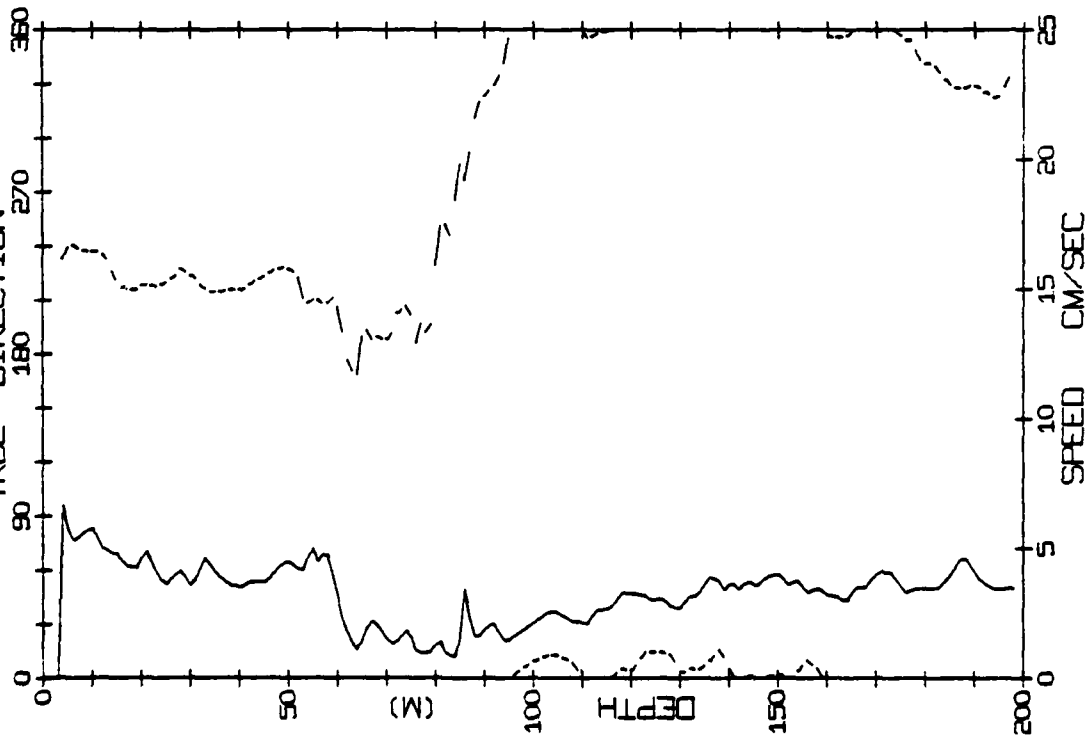




CAMP SNOWBIRD
DATE 13/ 5/75

STATION 17
TIME 545(GMT)

TRUE DIRECTION

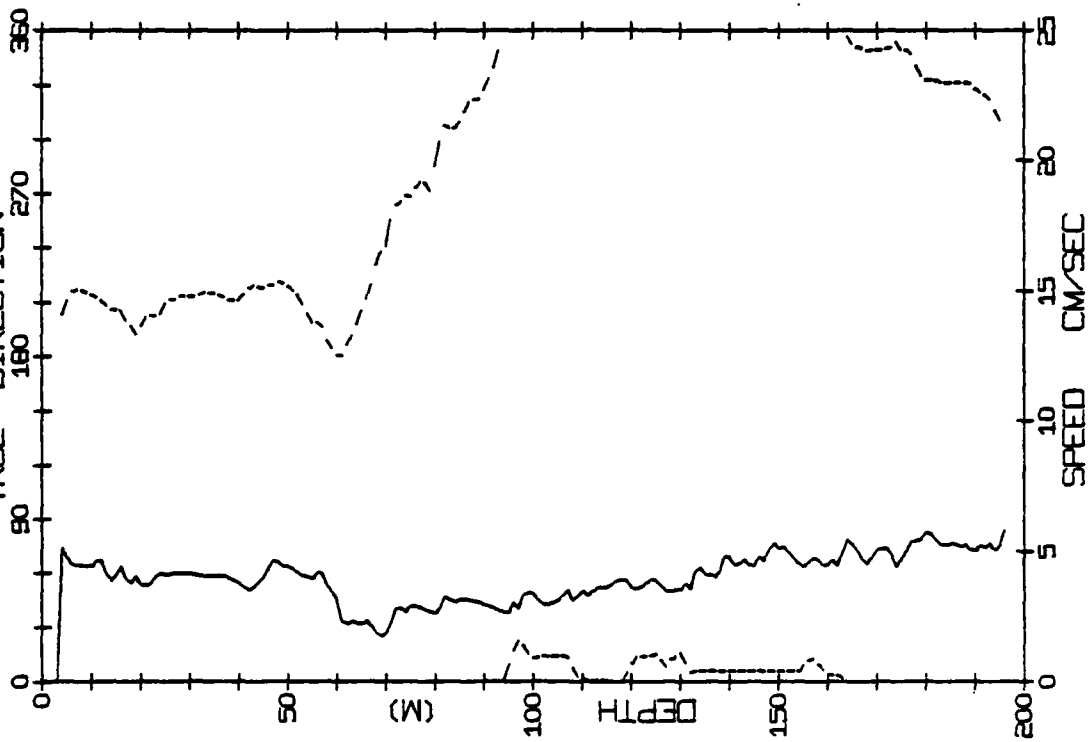


82

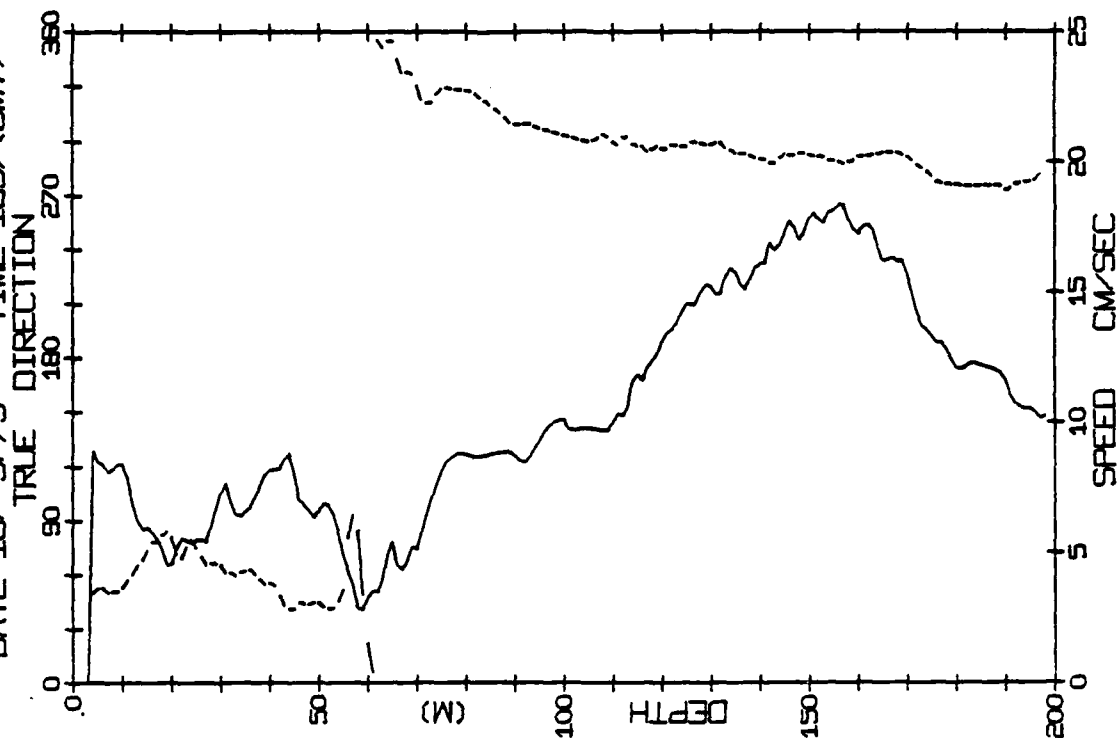
CAMP SNOWBIRD
DATE 13/ 5/75

STATION 18
TIME 1803(GMT)

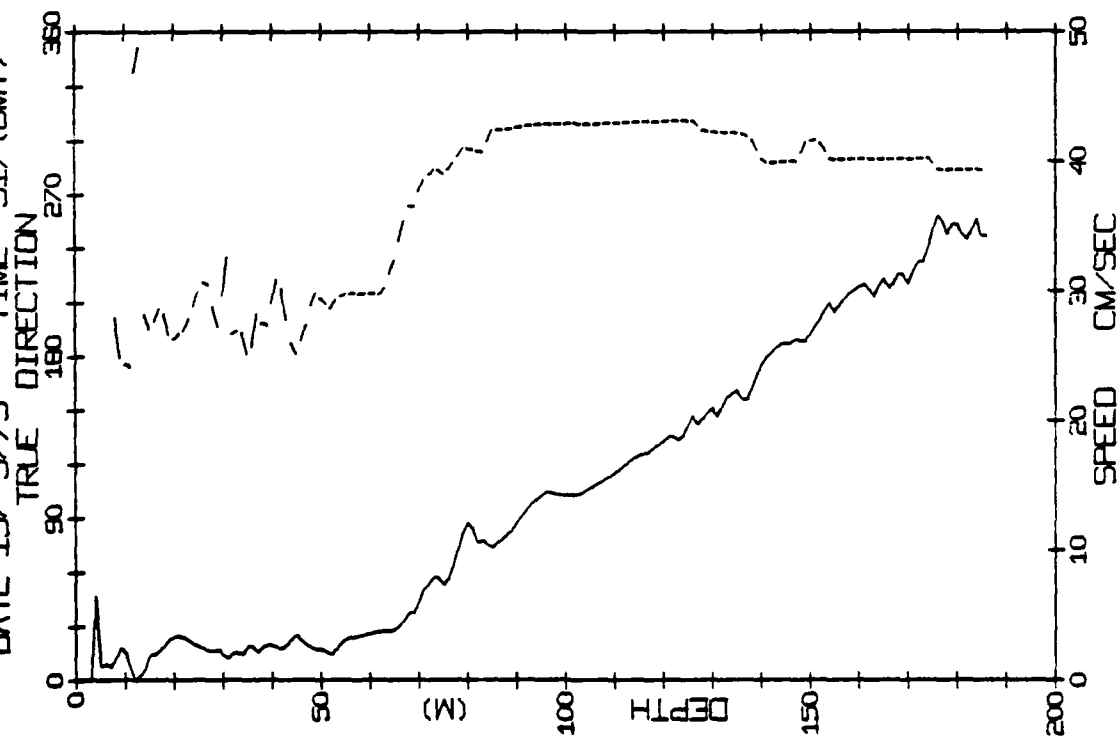
TRUE DIRECTION



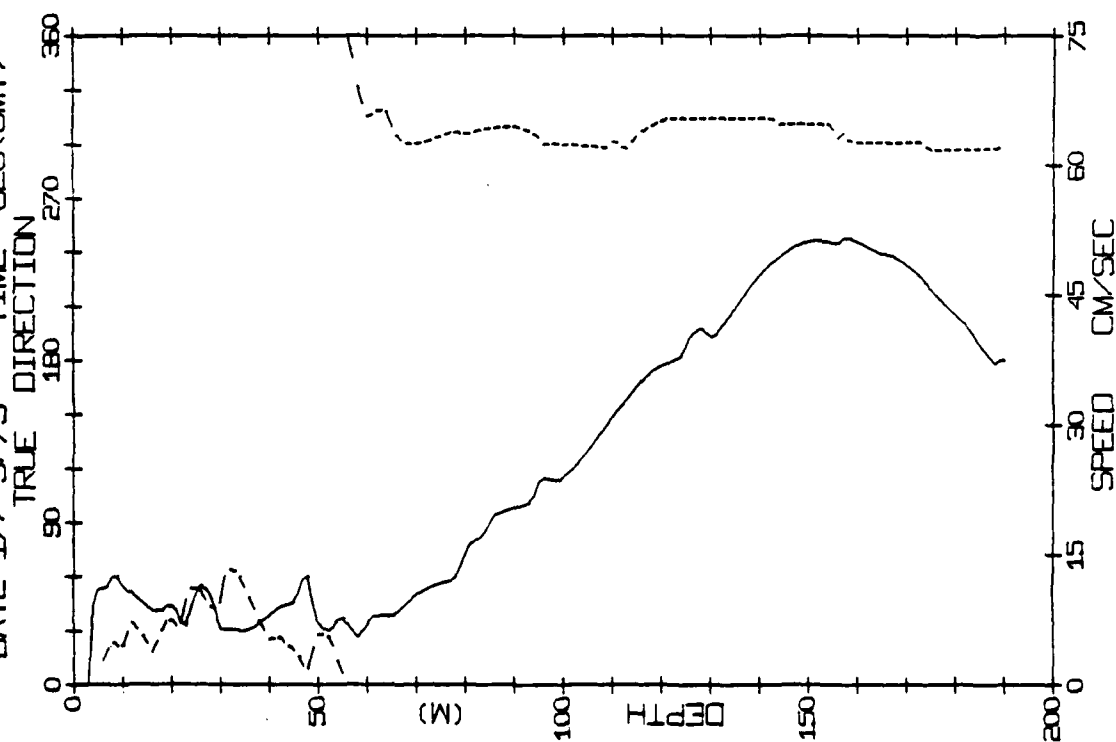
CAMP SNOWBIRD STATION 22
DATE 16/ 5/75 TIME 1857 (GMT)



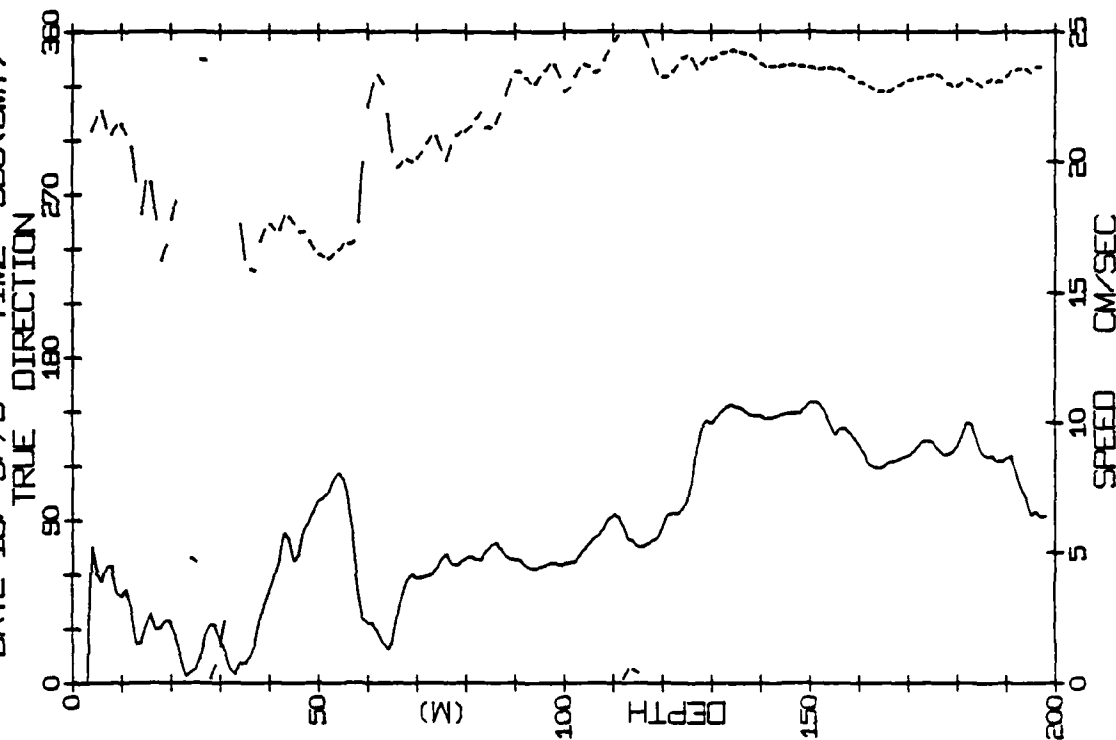
CAMP SNOWBIRD STATION 21
DATE 15/ 5/75 TIME 517 (GMT)



CAMP SNOWBIRD STATION 23
DATE 17/ 5/75 TIME 626 (GMT)



CAMP SNOWBIRD STATION 24
DATE 18/ 5/75 TIME 556 (GMT)



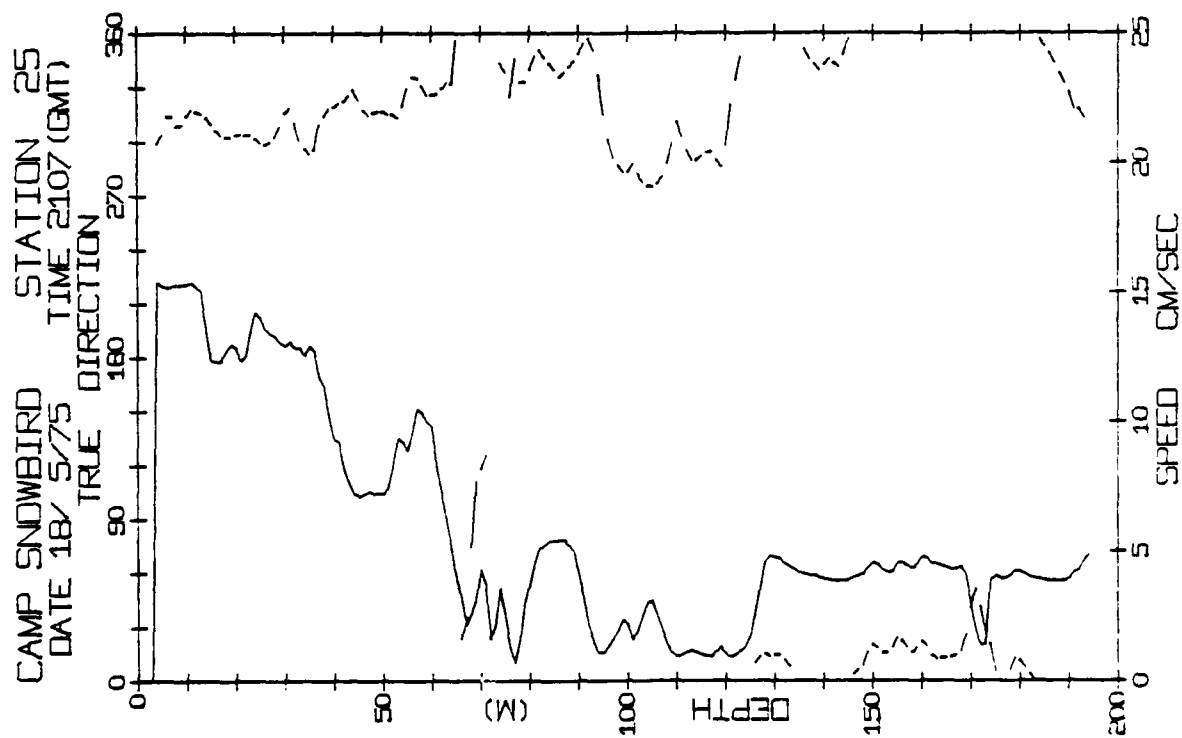
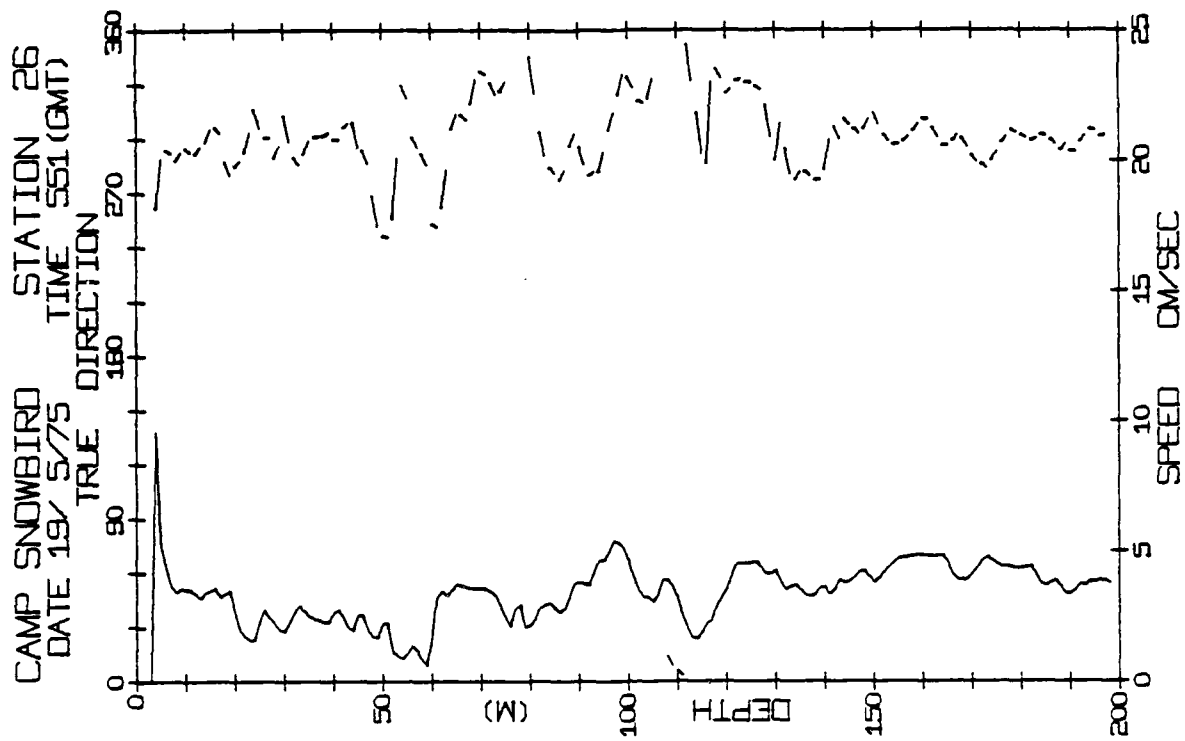
STATION 24
LONG-
EVEL-

ENC- 14

SNOWBIRD STATION
LAT- 76 1234N 11
LONG- 157 0700E

[illegible]

DN1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
DN2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
DN3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
DN4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
DN5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
DN6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81																			



AD-A109 990

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY PALISADES NY

F/G B/3

ARCTIC ICE DYNAMICS JOINT EXPERIMENT 1975-1976 PHYSICAL OCEANOGRAPHY--ETC(U)

FEB 80 T O MANLEY, K HUNKINS, W TIEMANN

N00014-76-C-0004

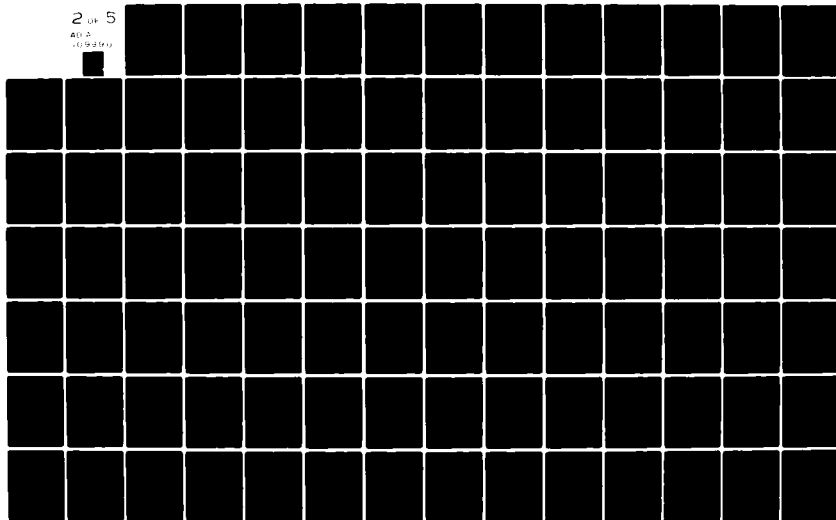
UNCLASSIFIED

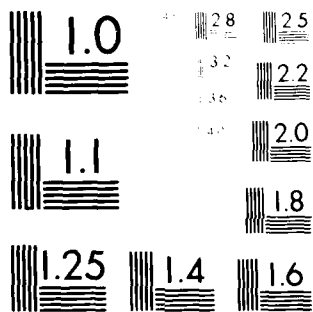
LDGO-CU-6-80

NL

2 OF 5

AD-A
-000000





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

SNOWBIRD STATION 26 (198M)
 LAT= 76.1519N LONG= 148.2418W
 NIVEL = -4.0 EIVEL = -10.2

SPRNBIRD STATION 25 (194M.)
LAT= 76.1592N LONG= 149.1032W
NIVEL= -0.7 FVEL= -20.8

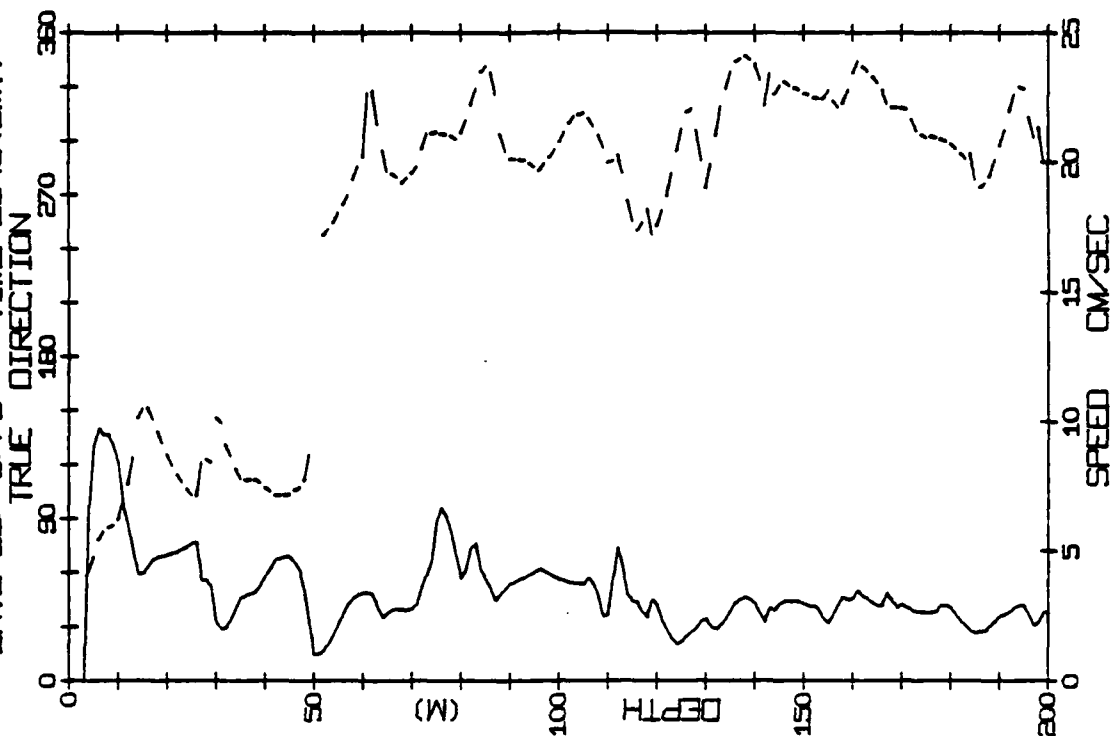
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70	0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70	0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00

[illegible][illegible][illegible]

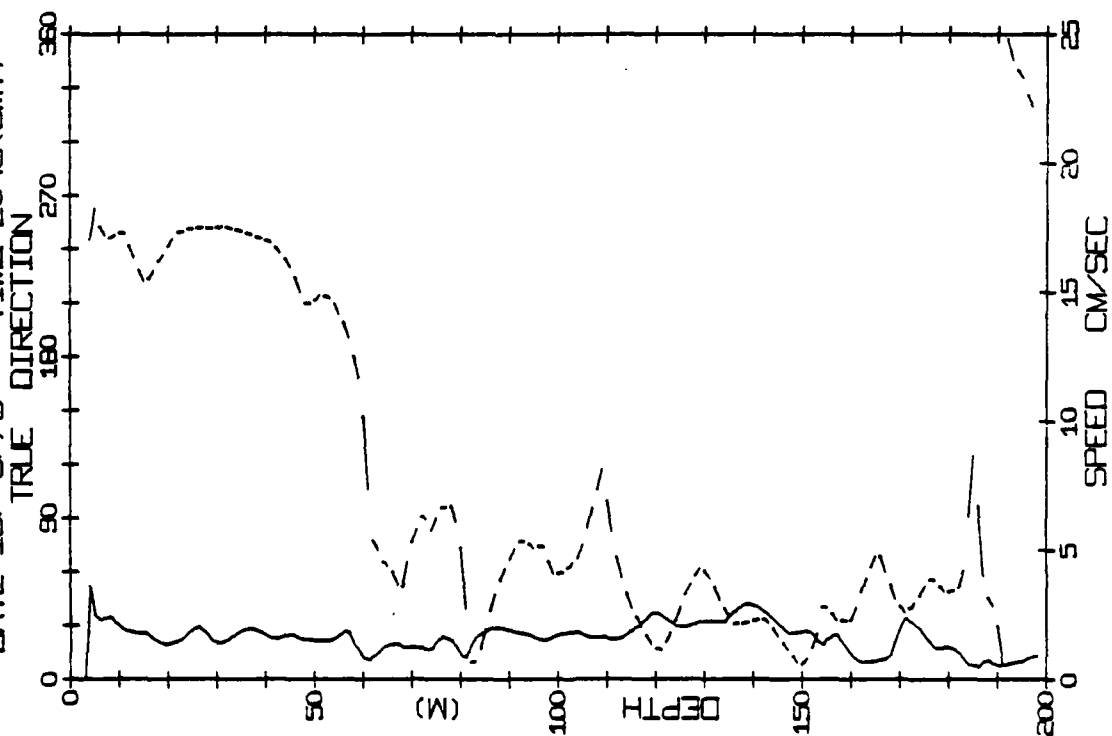
WPI	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
-----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

[illegible]

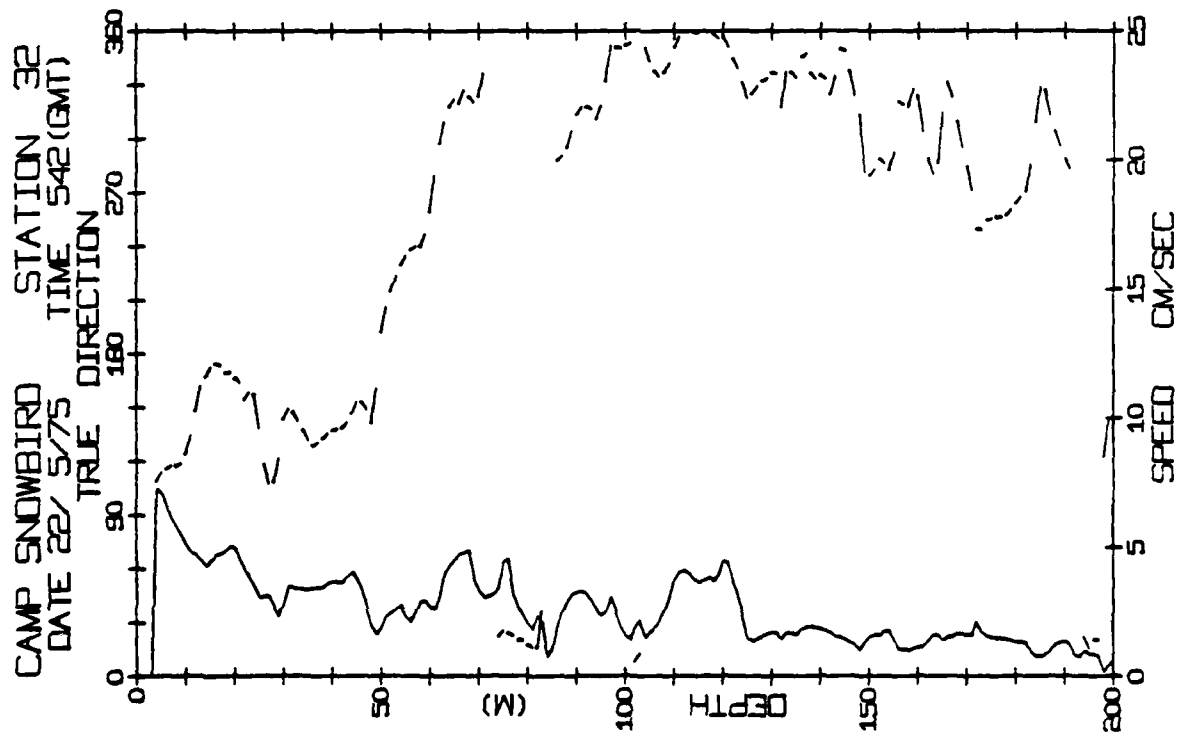
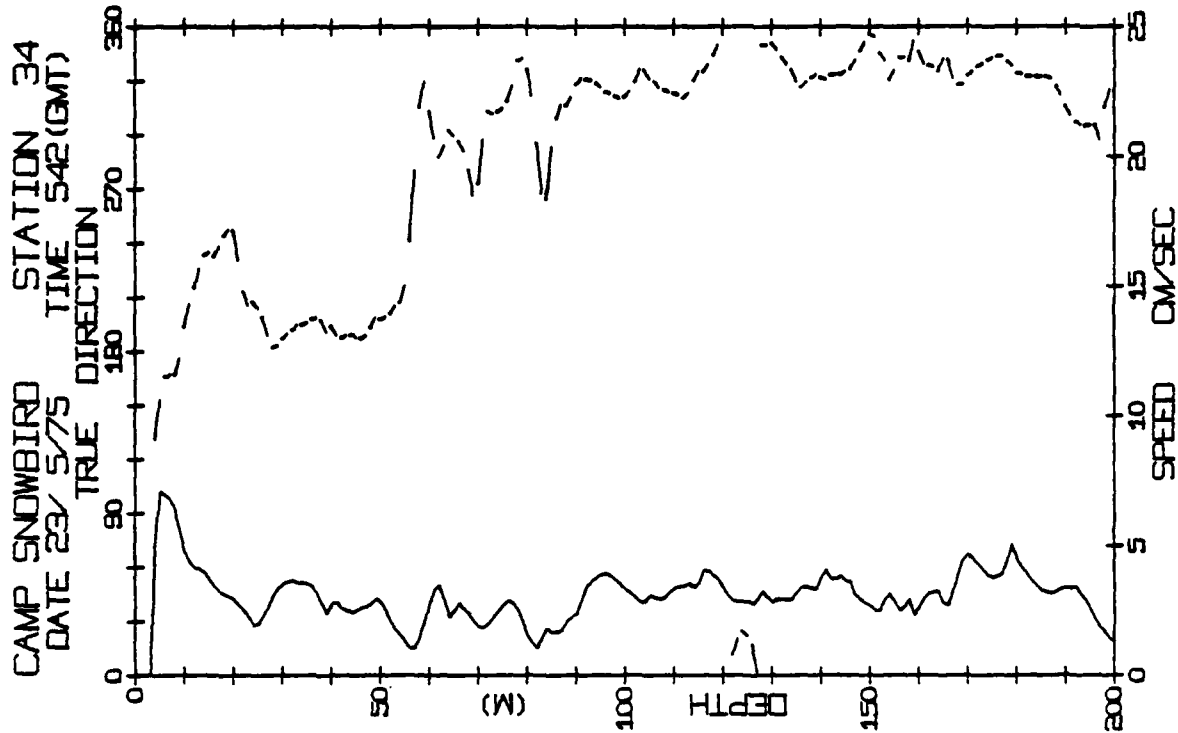
CAMP SNOWBIRD STATION 31
 DATE 21/ 5/75 TIME 2146 (GMT)



CAMP SNOWBIRD STATION 27
 DATE 19/ 5/75 TIME 2043 (GMT)

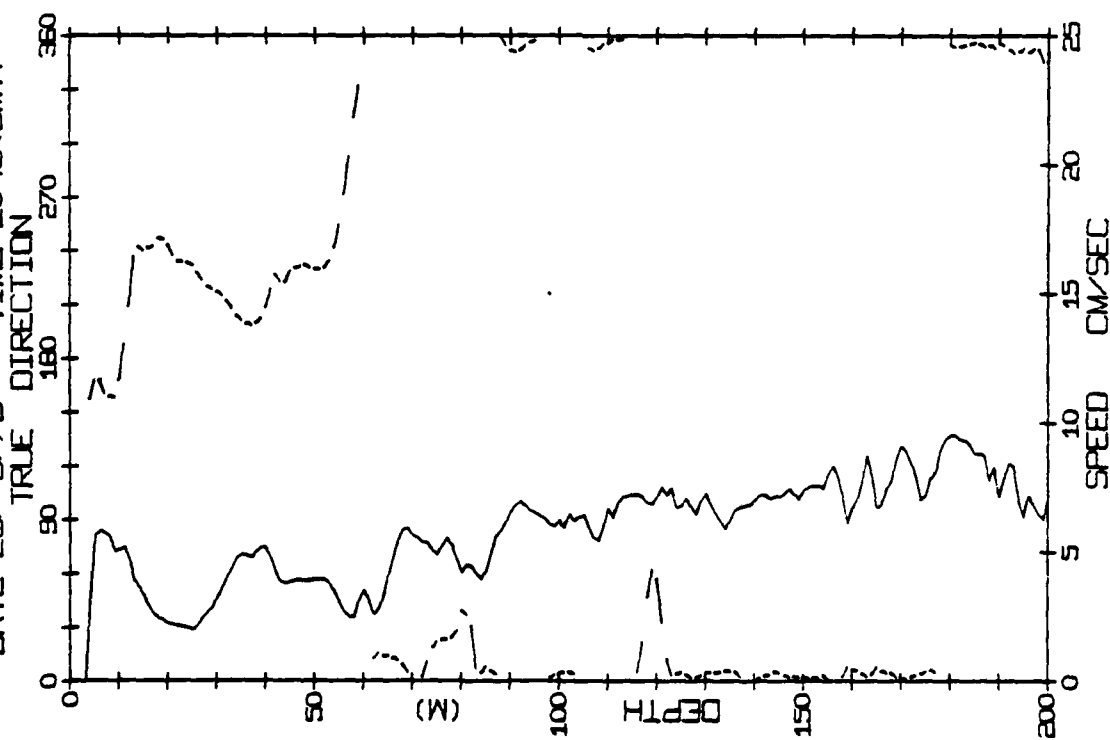


[illegible][illegible]



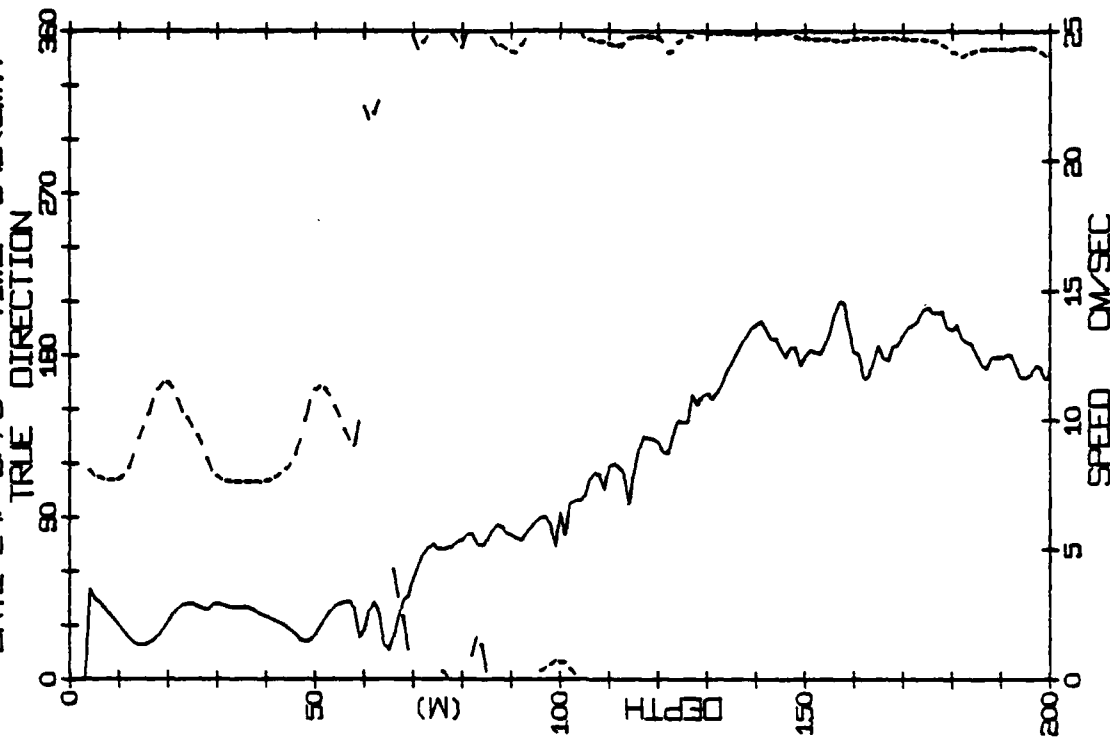
CAMP SNOWBIRD
DATE 23/ 5/75

STATION 35
TIME 2046 (GMT)

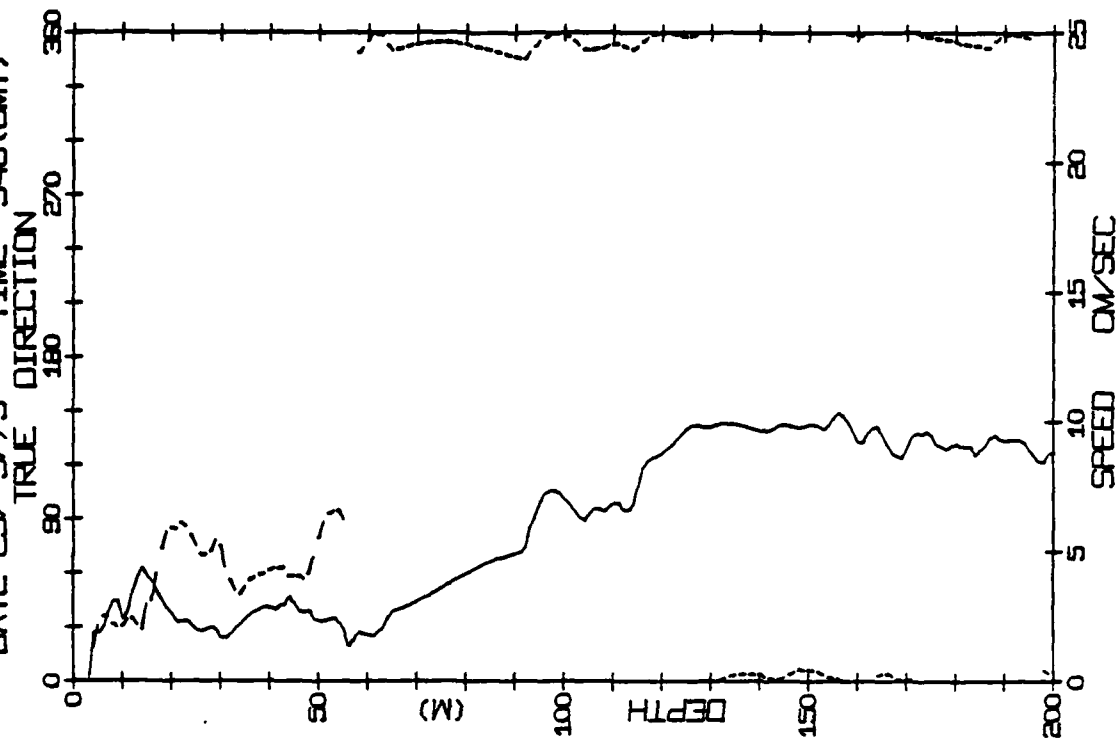


CAMP SNOWBIRD
DATE 24/ 5/75

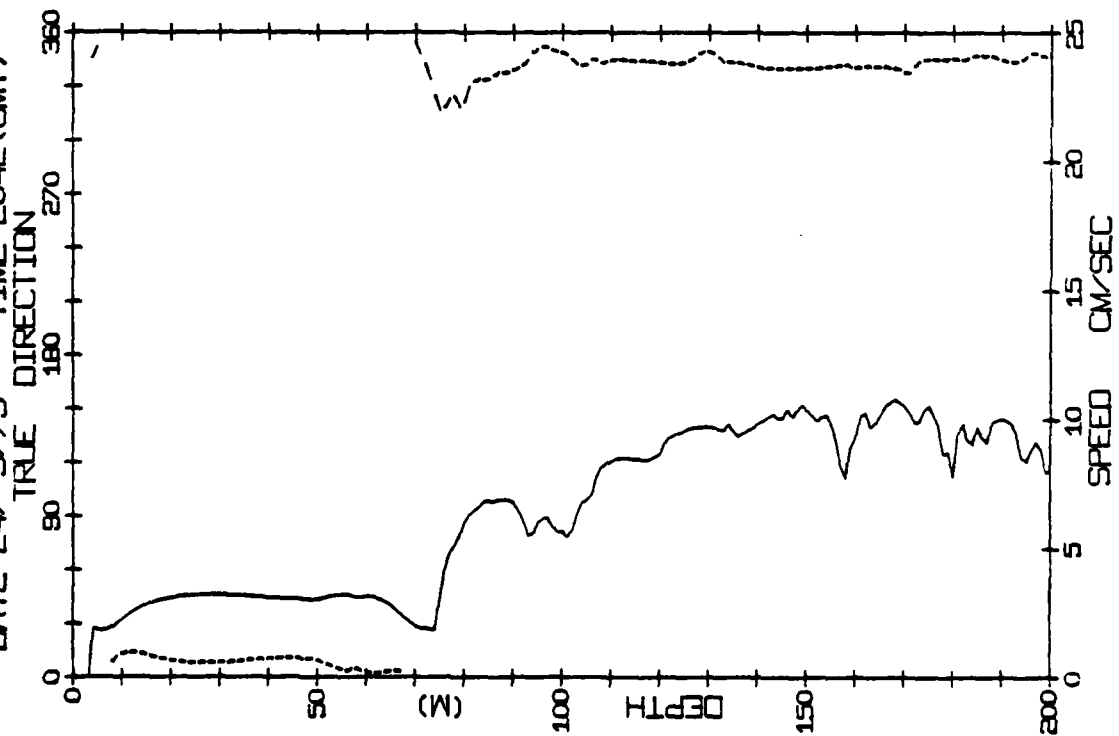
STATION 36
TIME 542 (GMT)



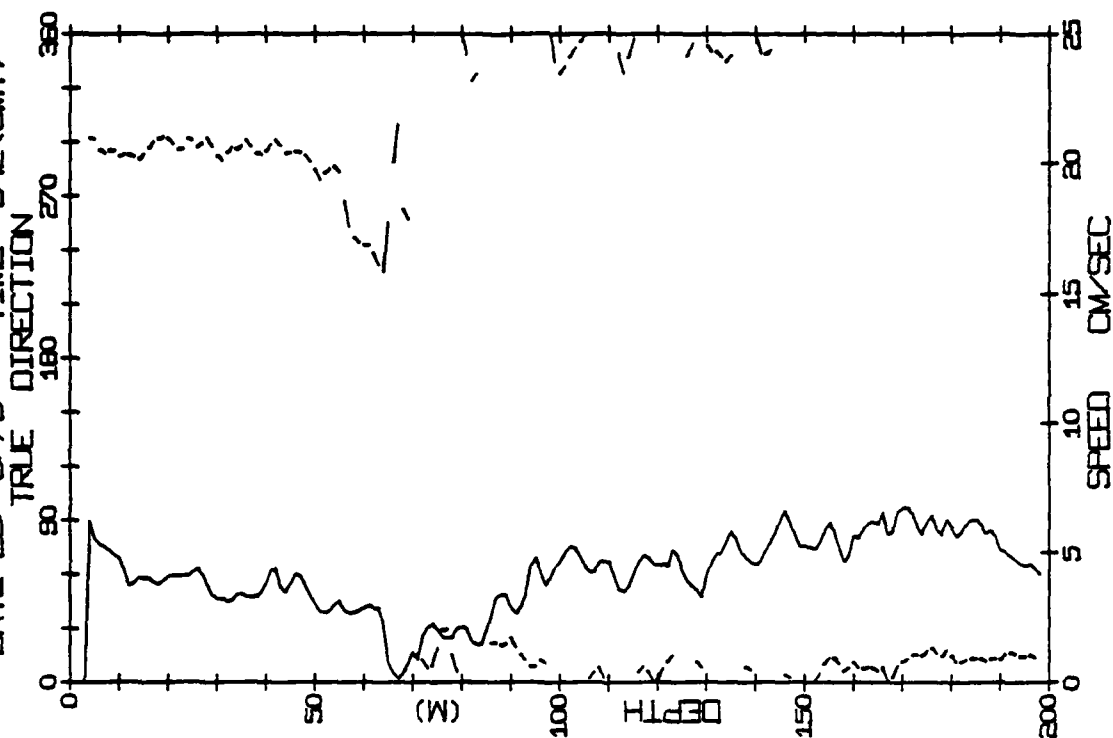
CAMP SNOWBIRD STATION 38
DATE 25/ 5/75 TIME 546(GMT)



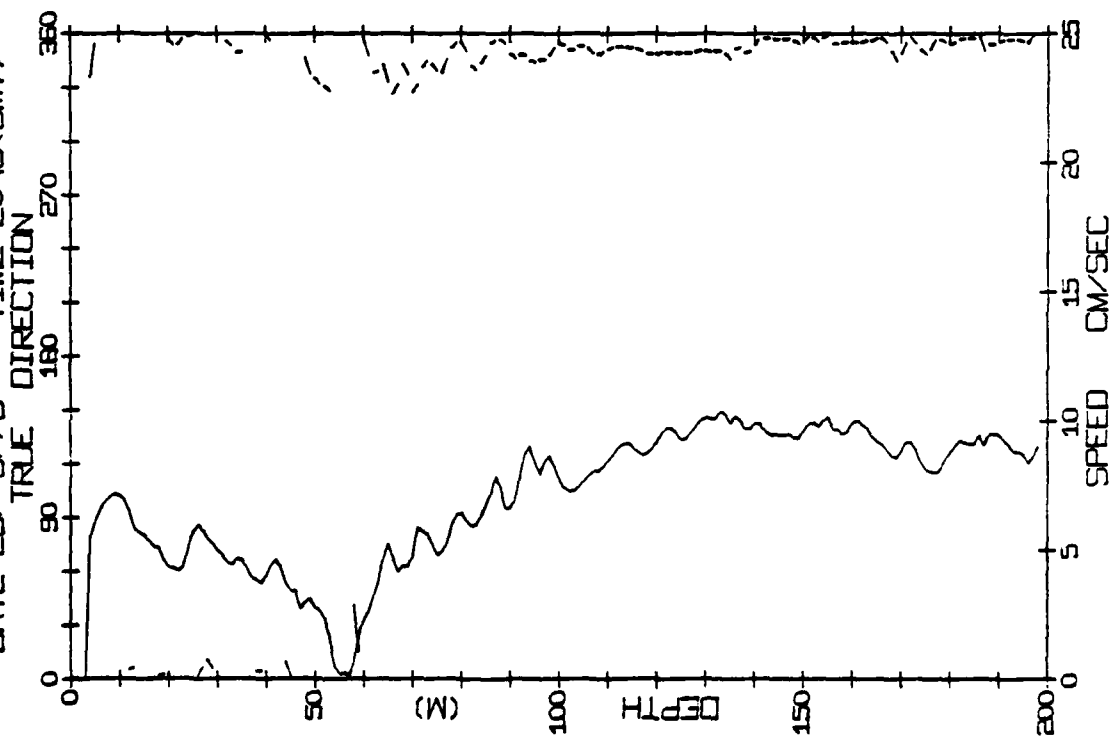
CAMP SNOWBIRD STATION 37
DATE 24/ 5/75 TIME 2042(GMT)



CAMP SNOWBIRD STATION 40
DATE 26/ 5/75 TIME 542(GMT)



CAMP SNOWBIRD STATION 39
DATE 25/ 5/75 TIME 2049(GMT)



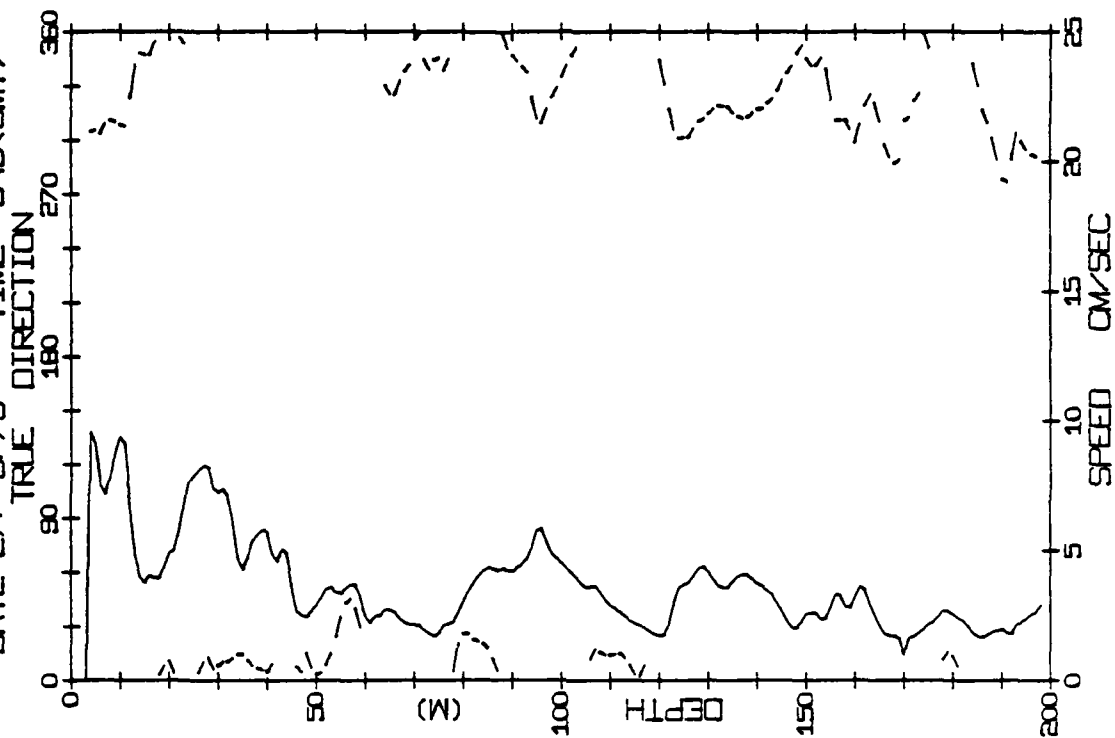
STATION 40 (198M) 26/MAY/75 542 QHT
 LAT- 76 18.24N LONG- 140 12.23W
 NIVEL- -0.4 EVEL- -7.5
 LCER- 1
 EVER- 0

DPT	4	307	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
DRN	4	307	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
SPD	4	307	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200

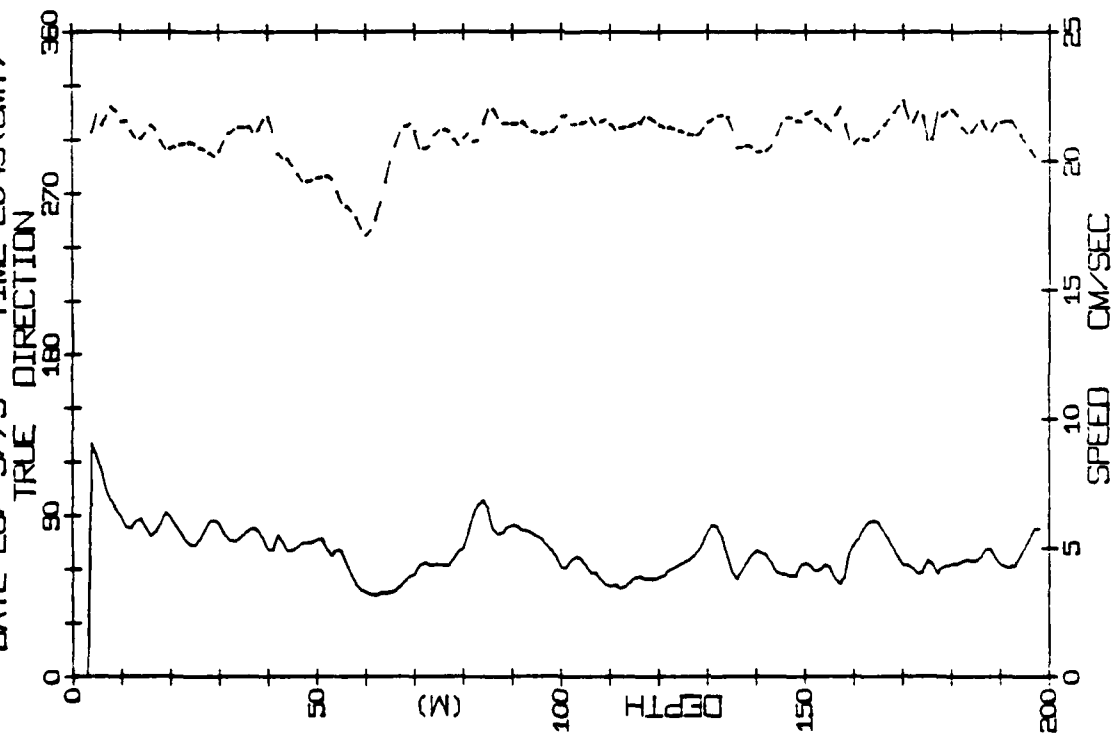
STATION 39 (198M) 26/MAY/75 549 QHT
 LAT- 76 17.50N LONG- 140 0.30W
 NIVEL- -5.5 EVEL- -7.7
 LCER- 1
 EVER- 0

DPT	4	307	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
DRN	4	307	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
SPD	4	307	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200

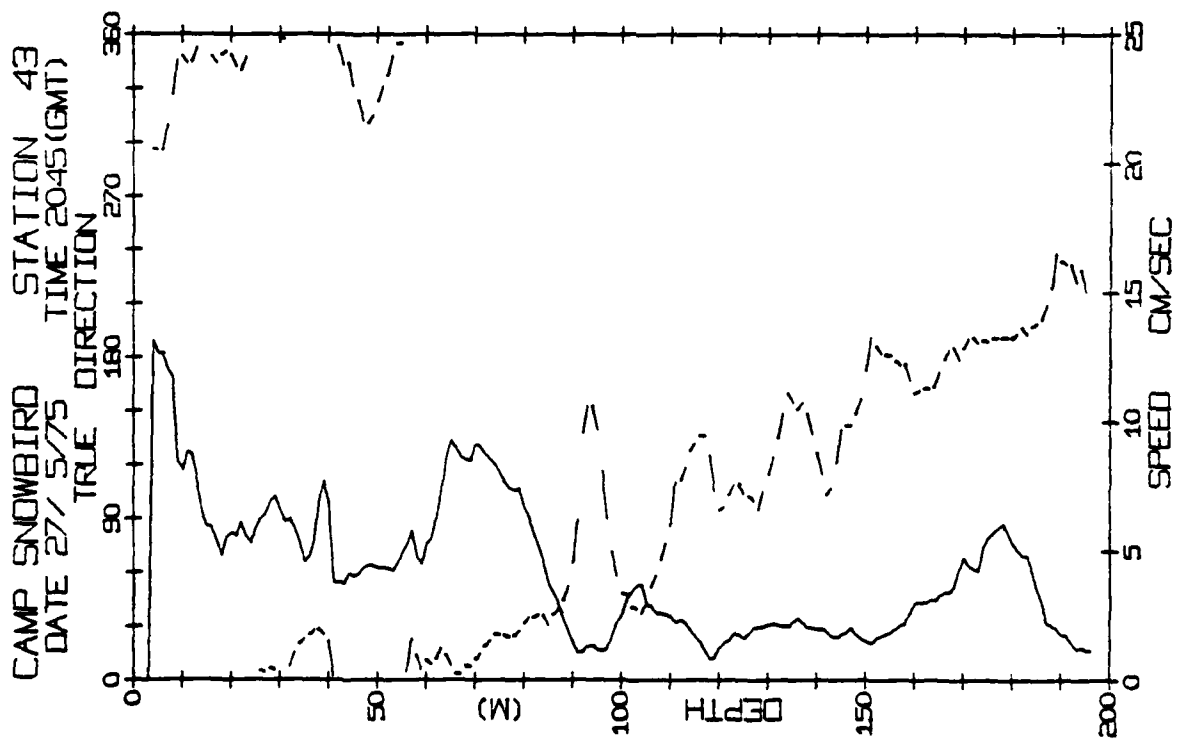
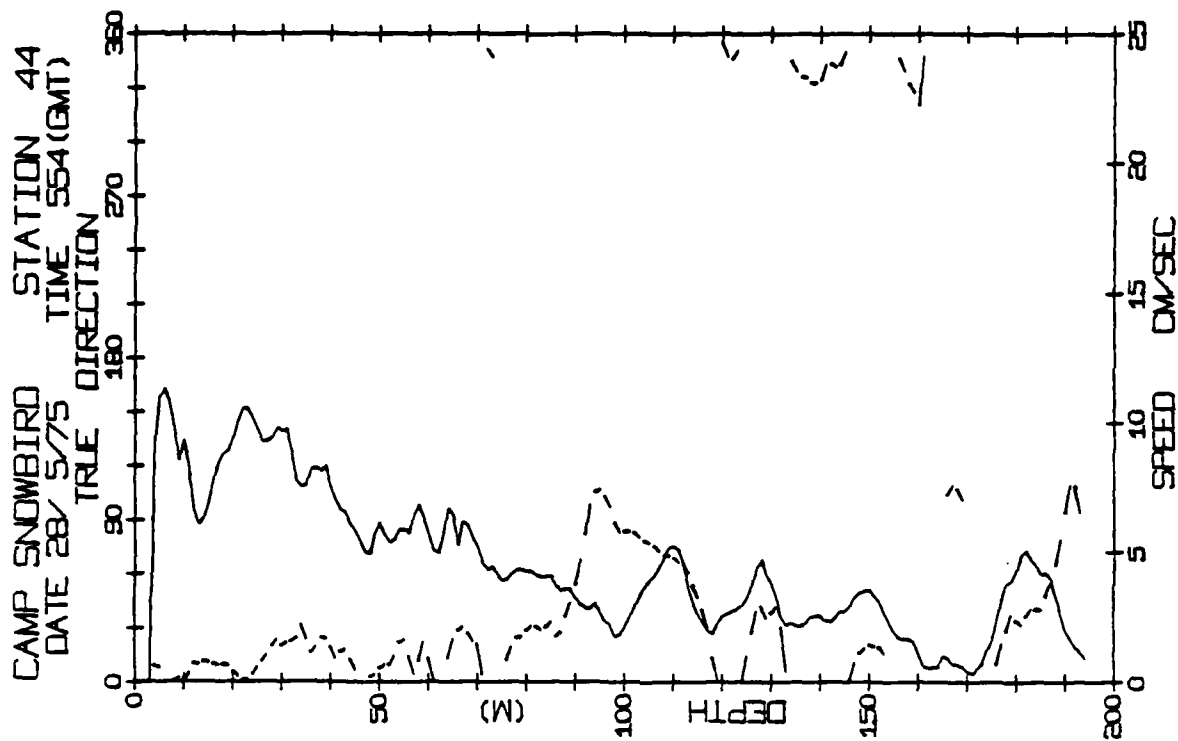
CAMP SNOWBIRD STATION 42
 DATE 27/ 5/75 TIME 549(GMT)



CAMP SNOWBIRD STATION 41
 DATE 26/ 5/75 TIME 2043(GMT)



101

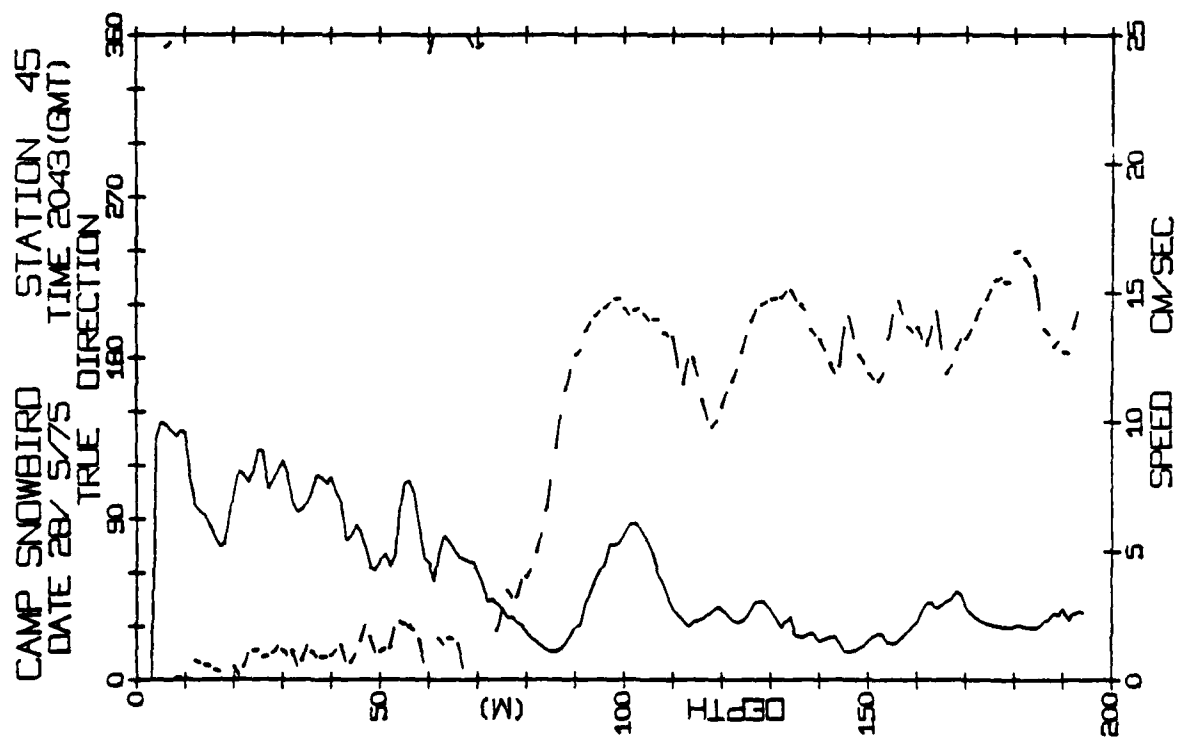
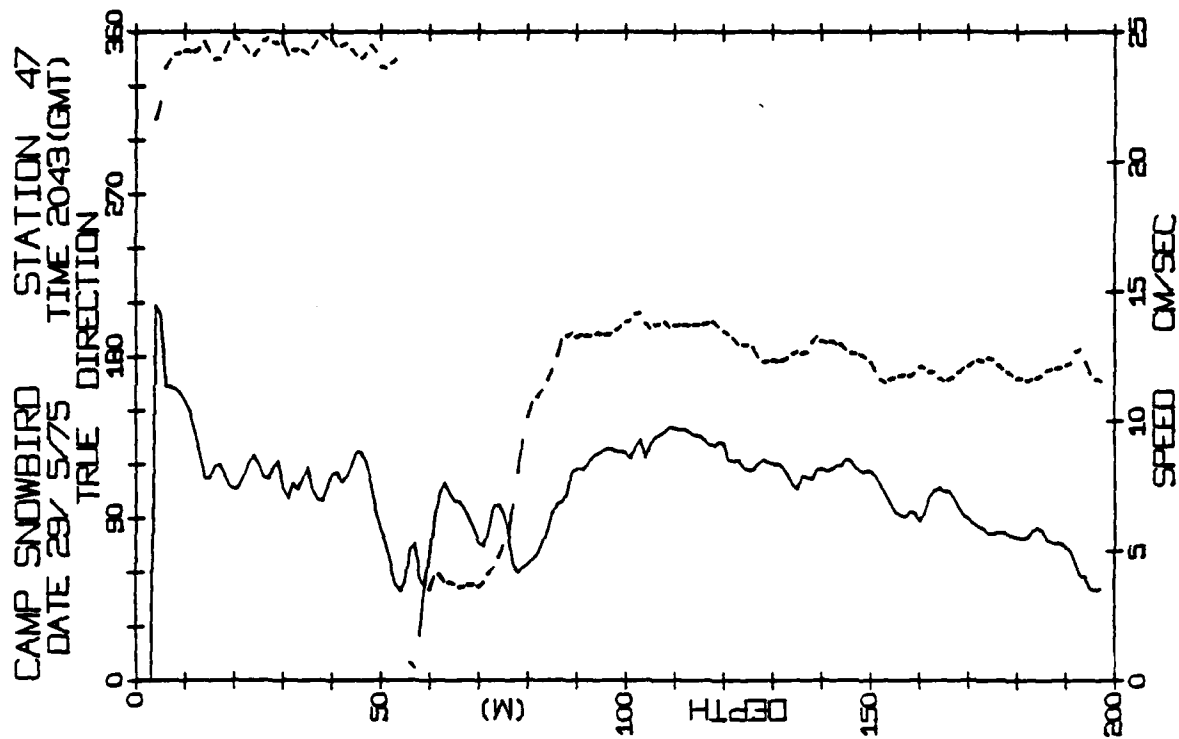


```

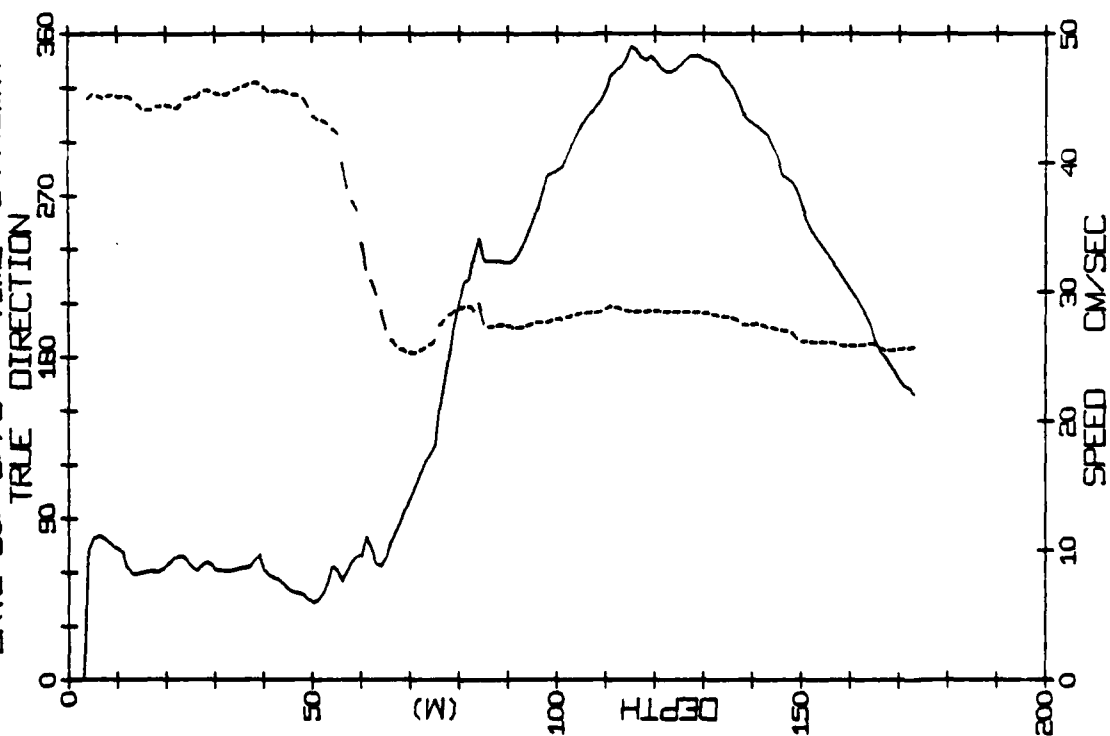
SENNIBIRD STATION 43 (192M) 27/MAY/75 2045 GMT
LAT= 76 1843N LONG= 148 5800W LTER= 0 LGER= 1
NLEVEL= 5.2 ELEVEL= -13.1 NVER= 0 EVER= 0

```

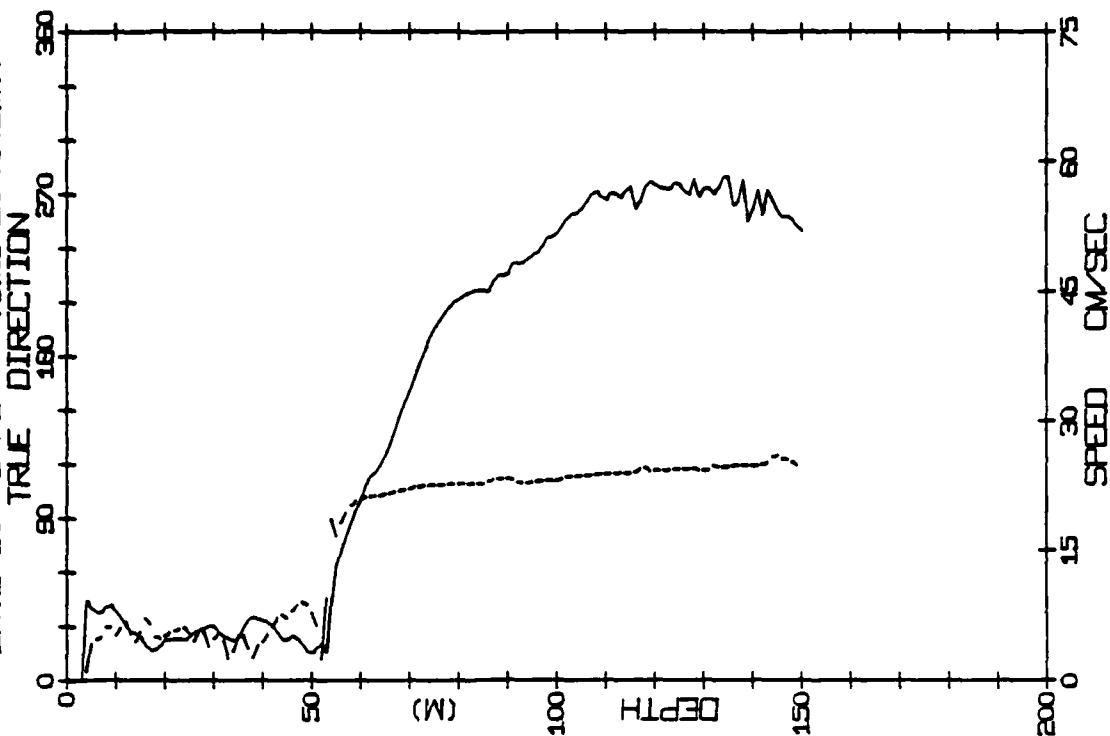
[illegible]



CAMP SNOWBIRD STATION 48
DATE 30/ 5/75 TIME 544(GMT)



CAMP SNOWBIRD STATION 49
DATE 30/ 5/75 TIME 2043(GMT)



SNOWBIRD STATION 49 (150M)
 LAT= 76.349N LONG= 149.6592W
 NIVEL= -73
 30/MAY/75
 LTER= 1
 EVER= 0
 2043 GMT
 LGER= 1
 EVER= 0

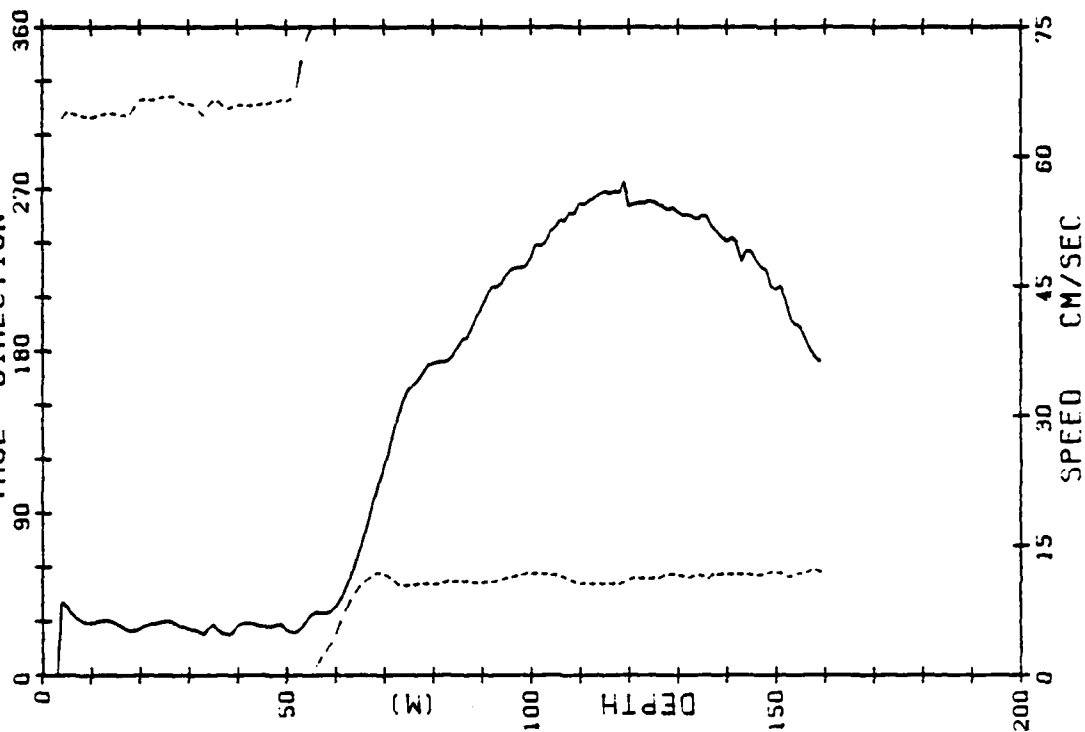
DPT	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
SPD	58	58	54	54	53	53	53	53	53	53	53	53	53	53	53	53	53
DRN	118	118	119	119	119	119	119	119	119	119	119	119	119	119	119	119	118

SNOWBIRD STATION 48 (173M)
 LAT= 76.311N LONG= 149.5214W
 NIVEL= -107
 30/MAY/75
 LTER= 1
 EVER= 0
 544 GMT
 LGER= 1
 EVER= 0

DPT	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
SPD	46	46	45	44	43	43	42	42	41	40	39	38	37	36	35	34	33
DRN	202	202	201	198	198	197	196	194	194	192	188	188	188	188	184	184	185

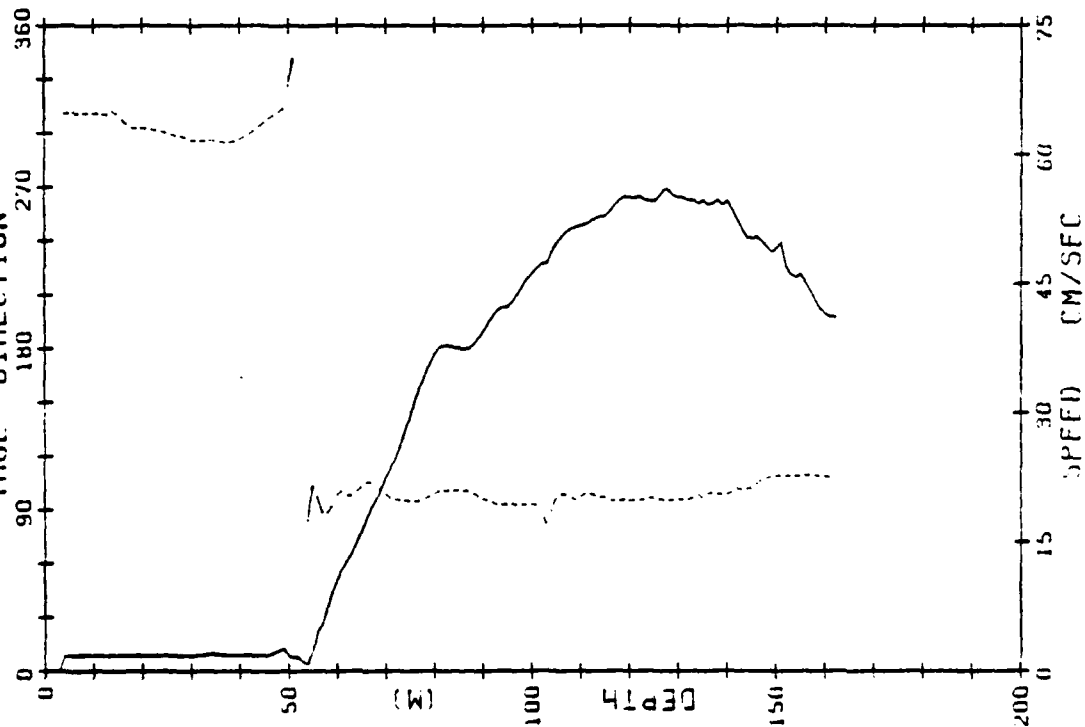
CAMP SNOWBIRD STATION 51
DATE 31/ 5/75 TIME 2040 (GMT)

TRUE DIRECTION



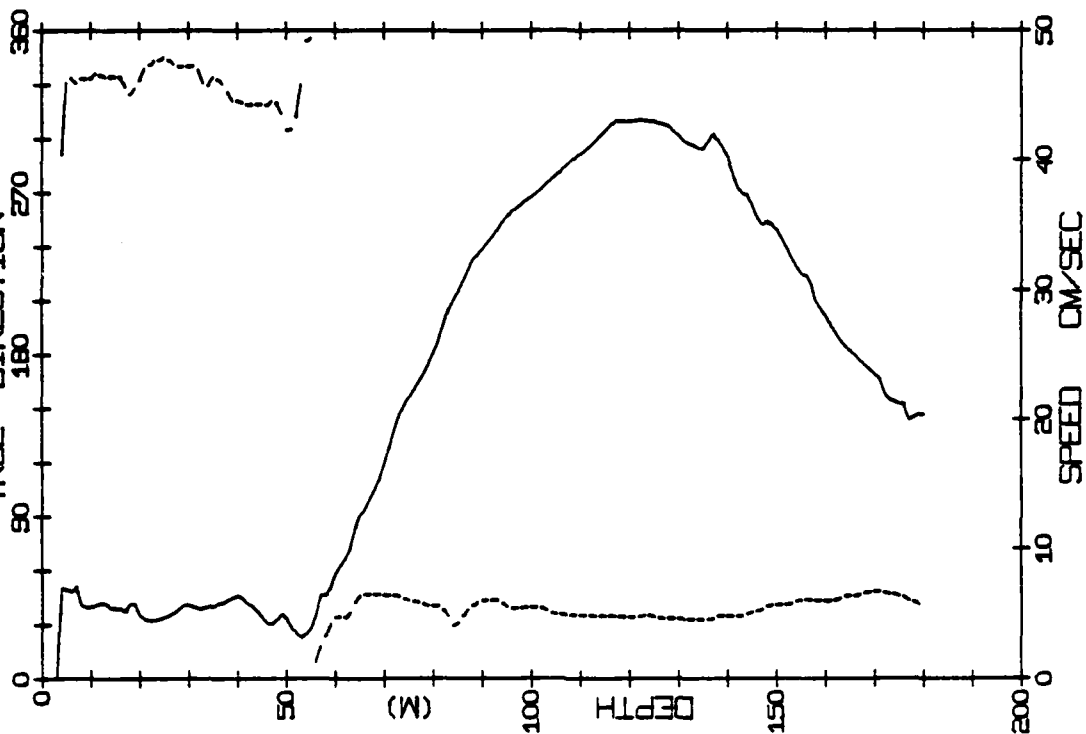
CAMP SNOWBIRD STATION 50
DATE 31/ 5/75 TIME 544 (GMT)

TRUE DIRECTION



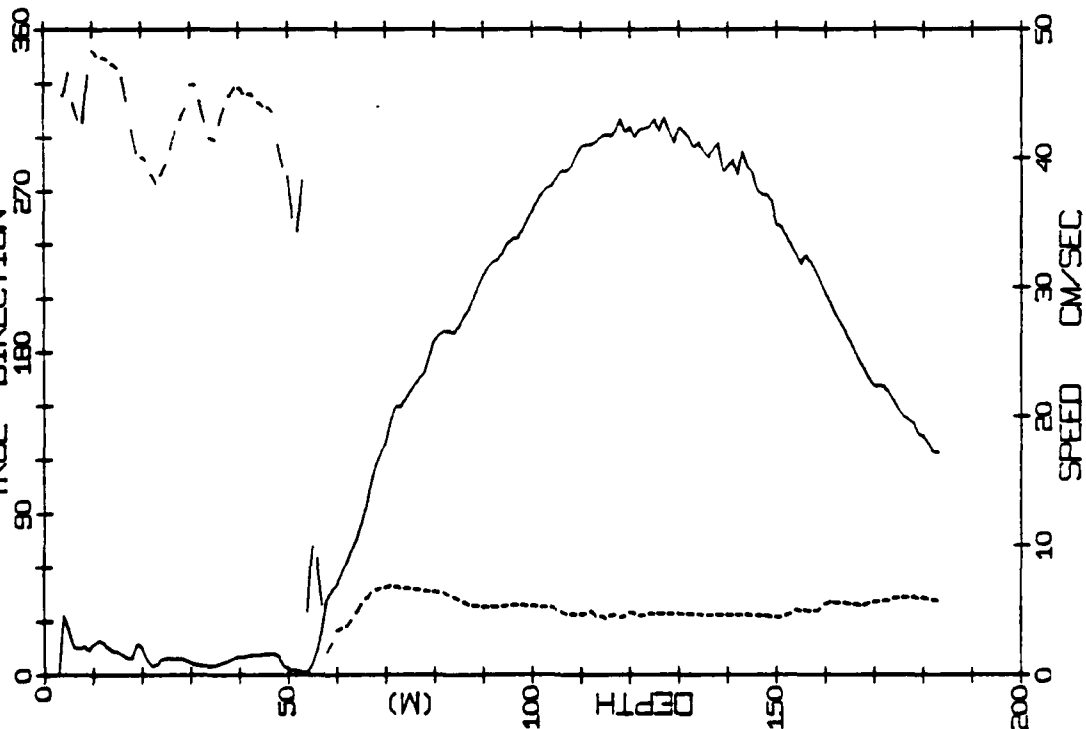
CAMP SNOWBIRD STATION 53
DATE 1/6/75 TIME 2213(GMT)

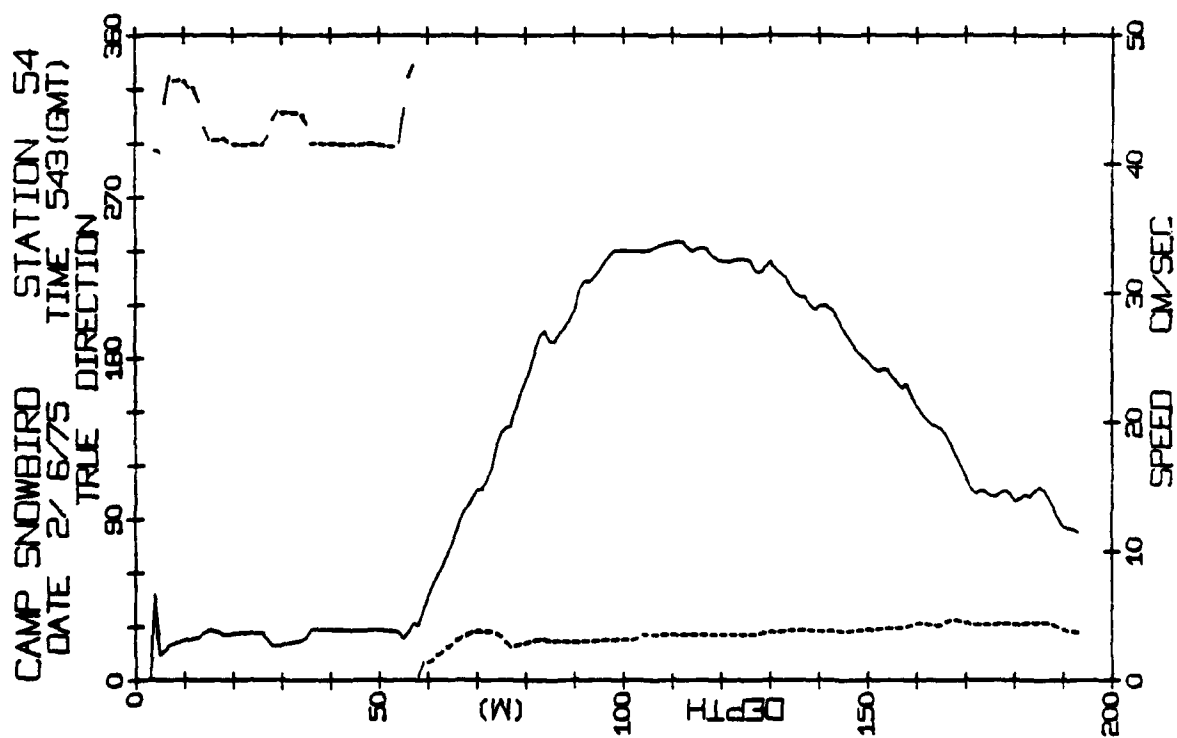
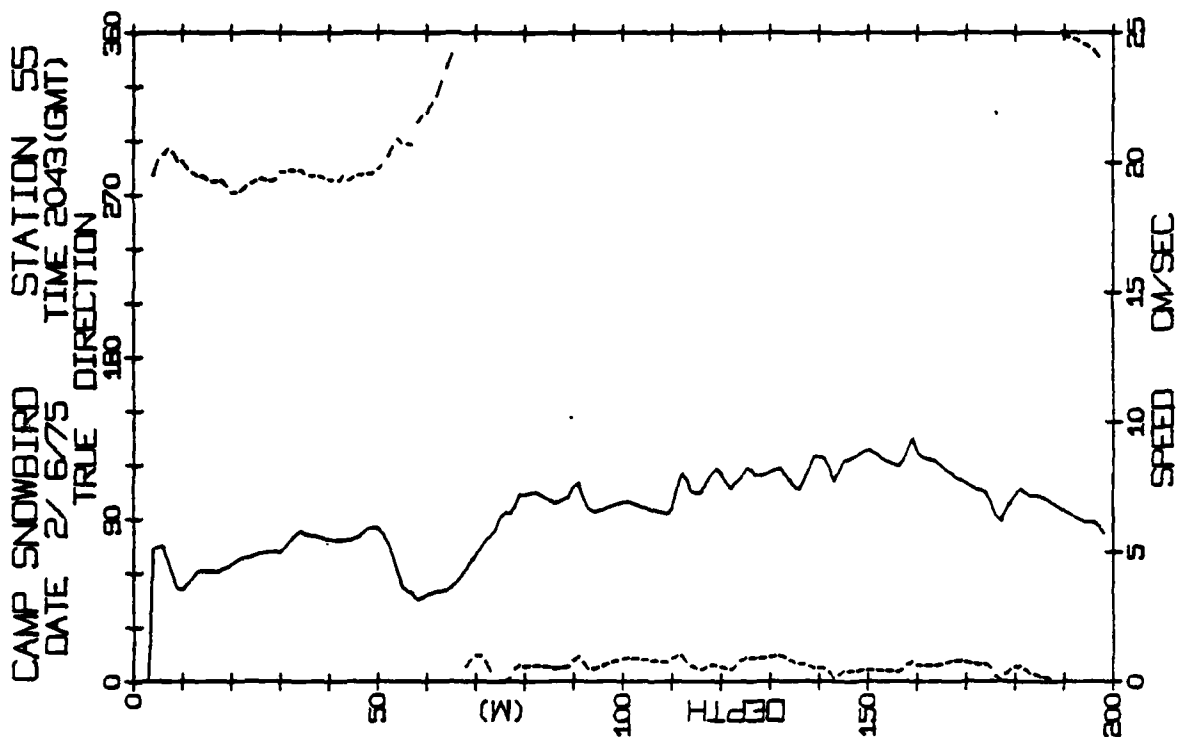
TRUE DIRECTION



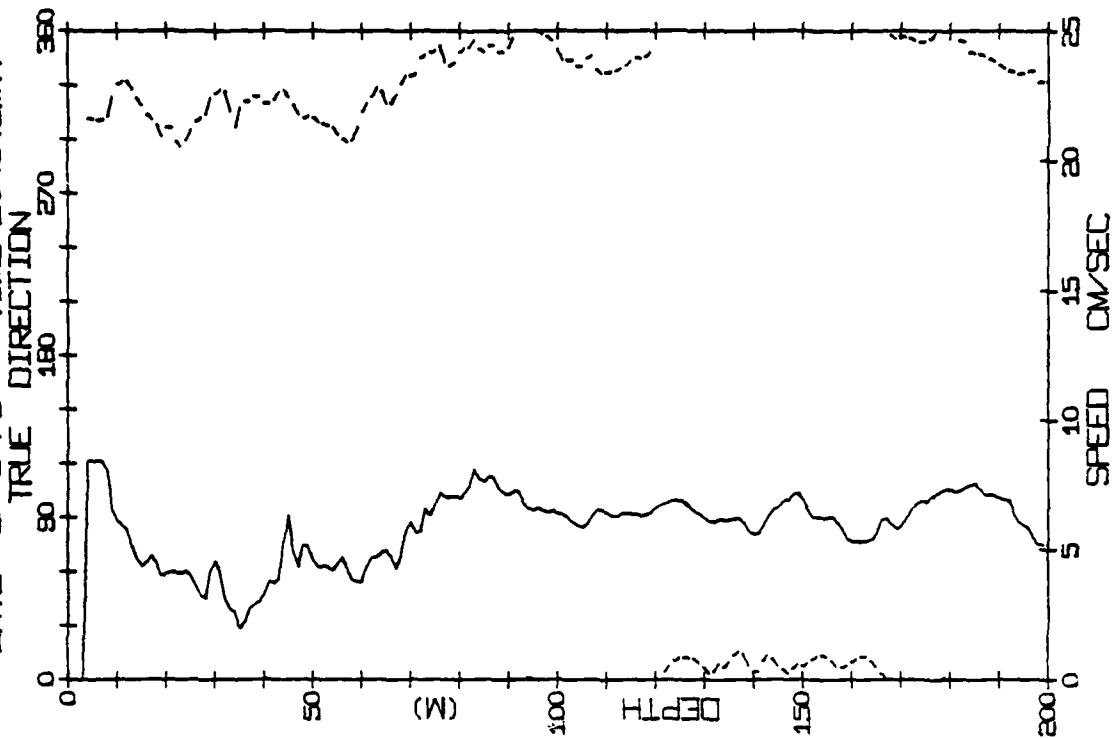
CAMP SNOWBIRD STATION 52
DATE 1/6/75 TIME 544(GMT)

TRUE DIRECTION

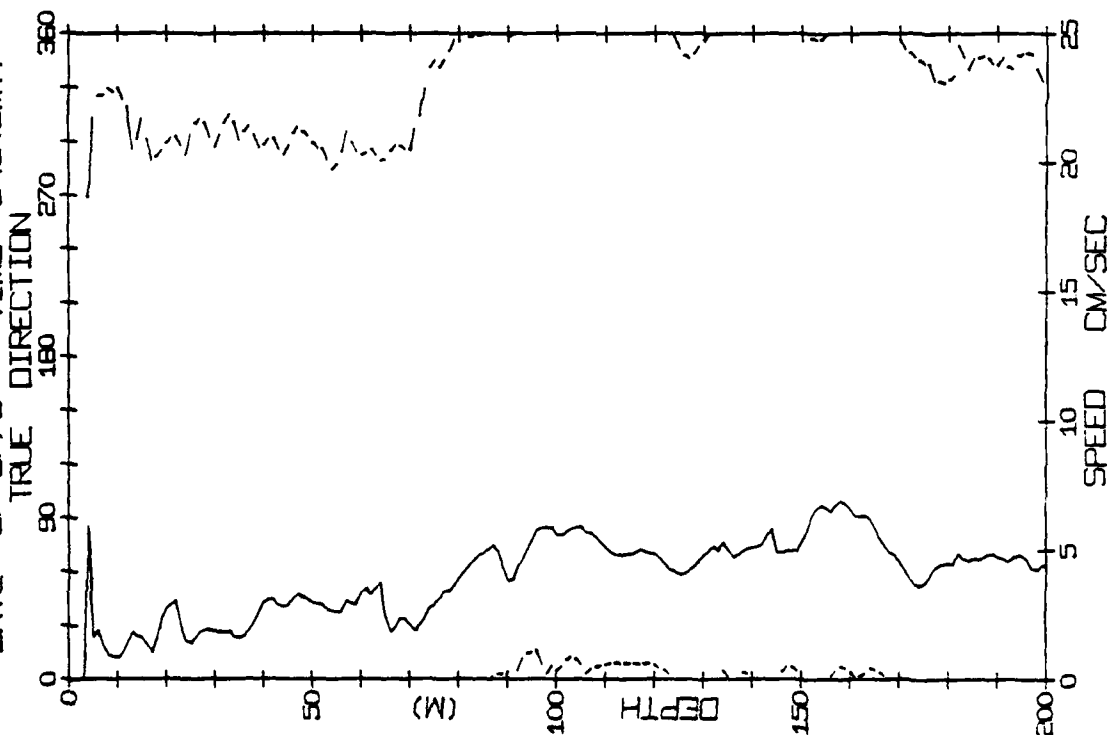


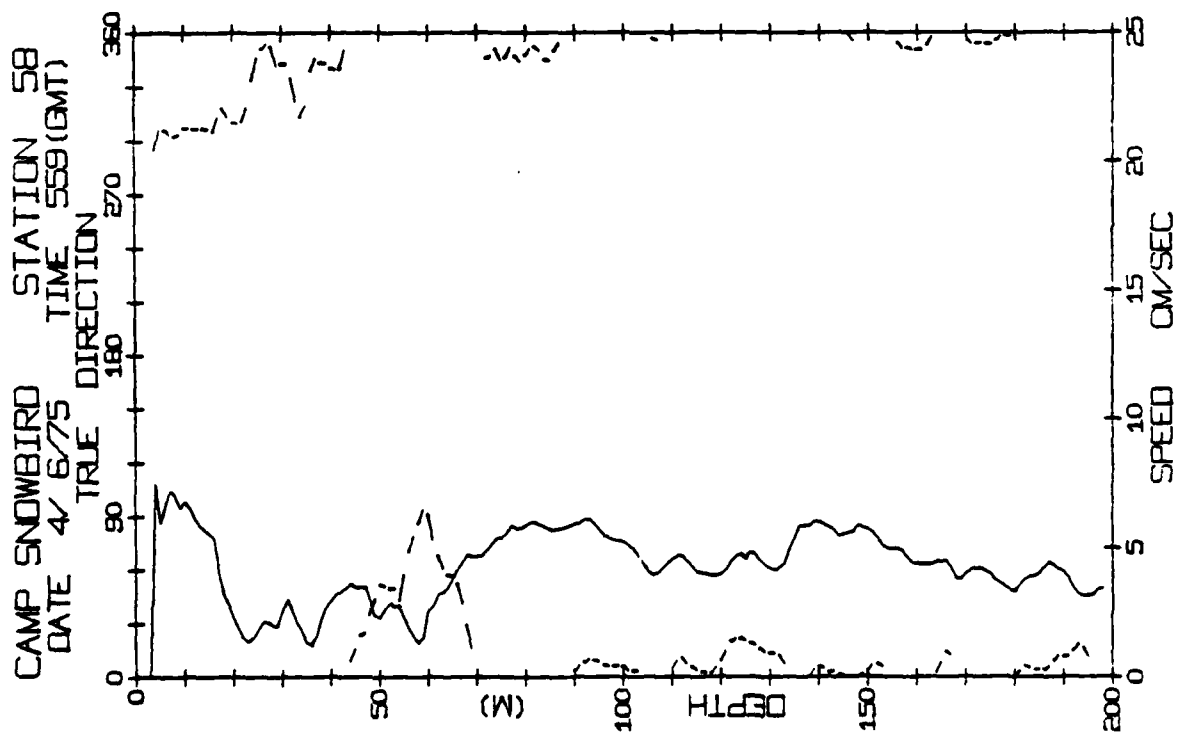
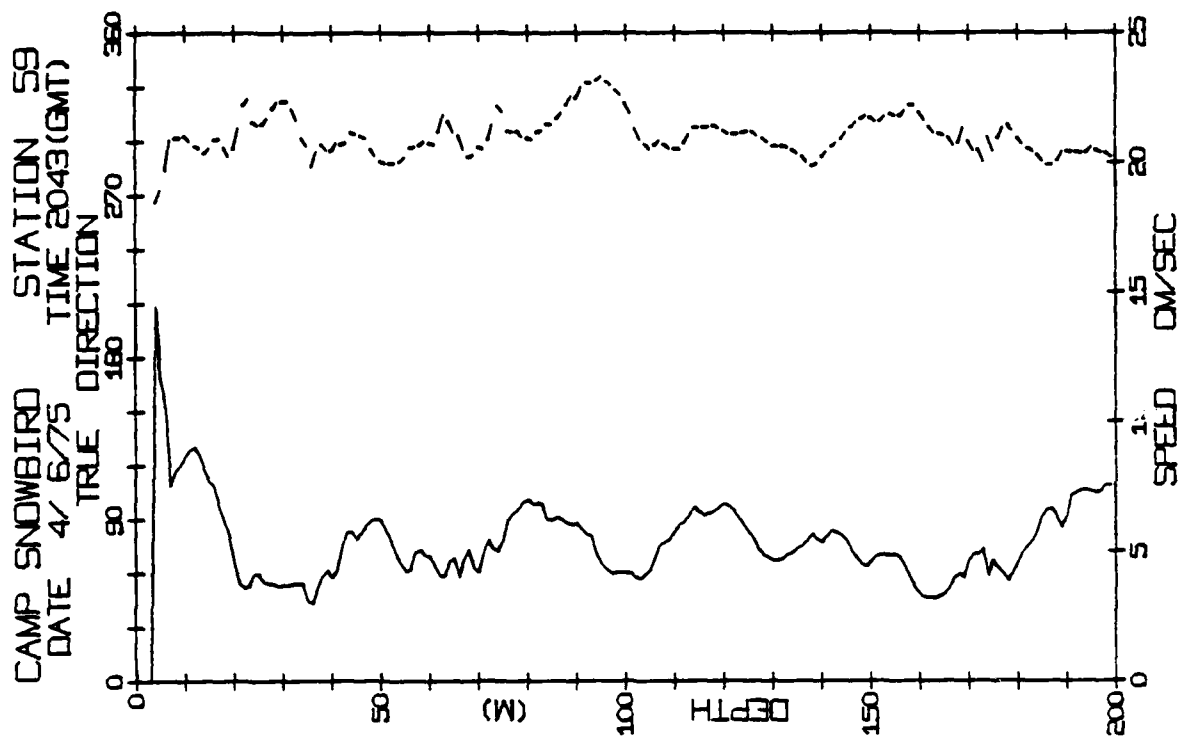


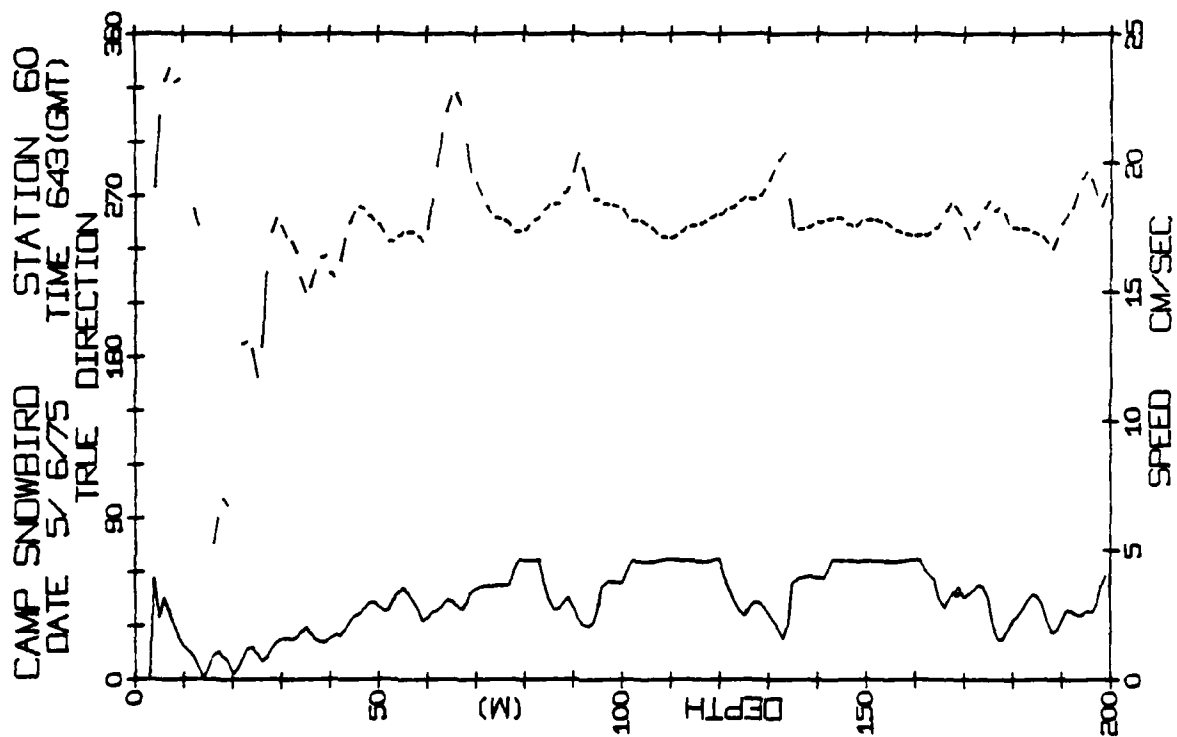
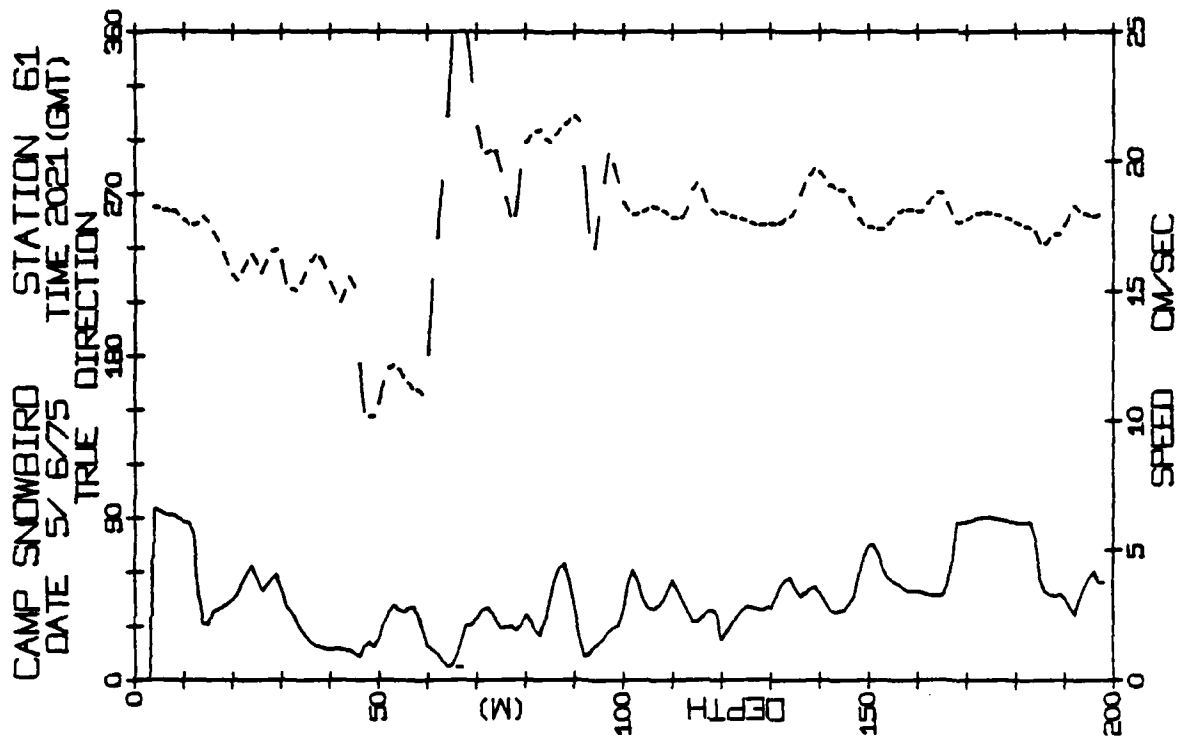
CAMP SNOWBIRD STATION 57
DATE 3/ 6/75 TIME 2043(GMT)

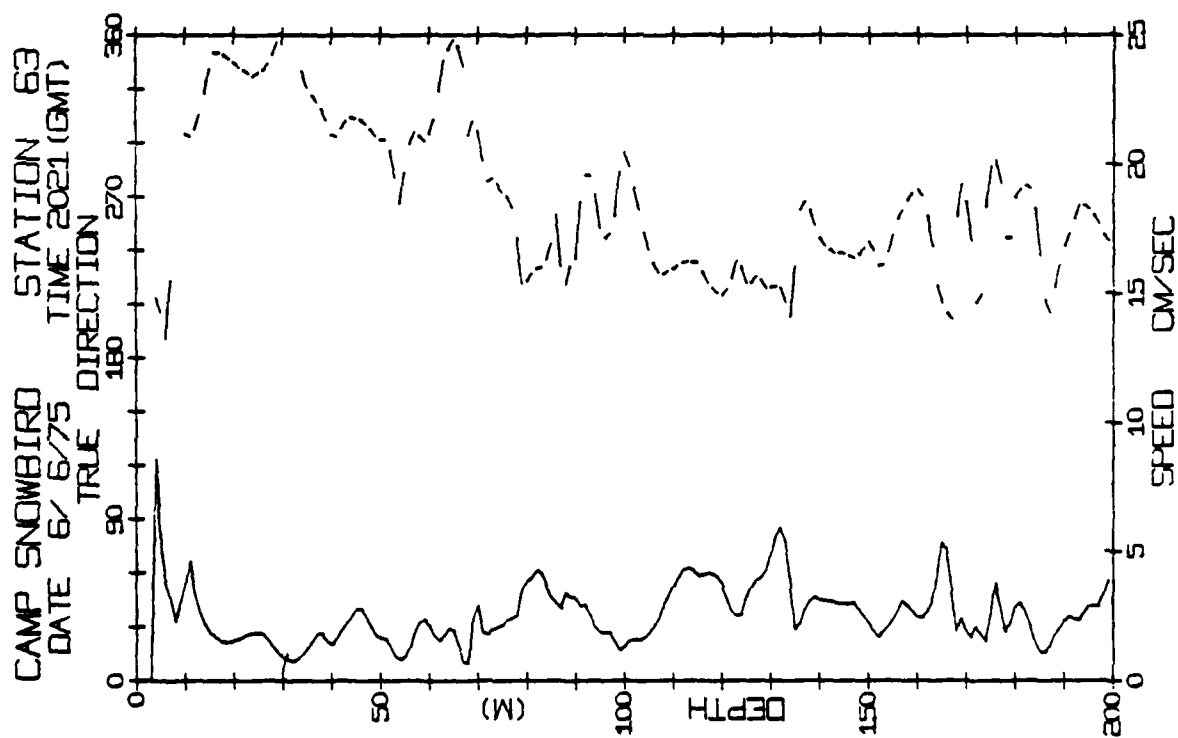
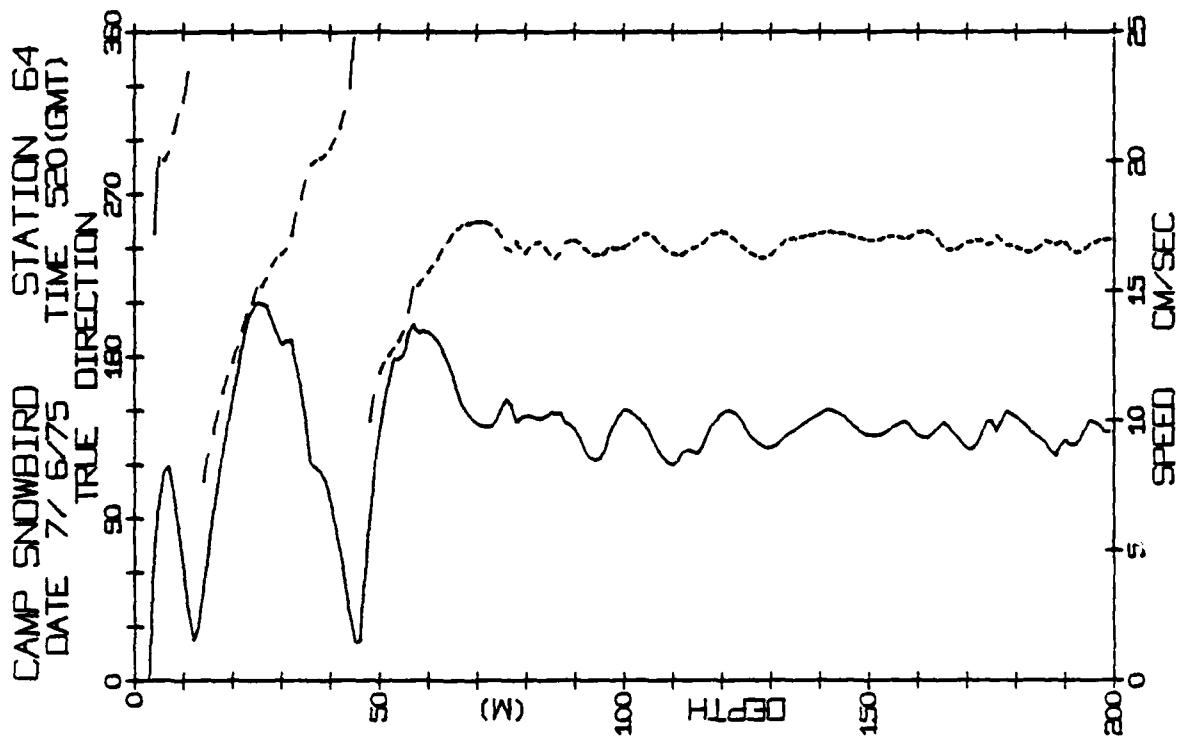


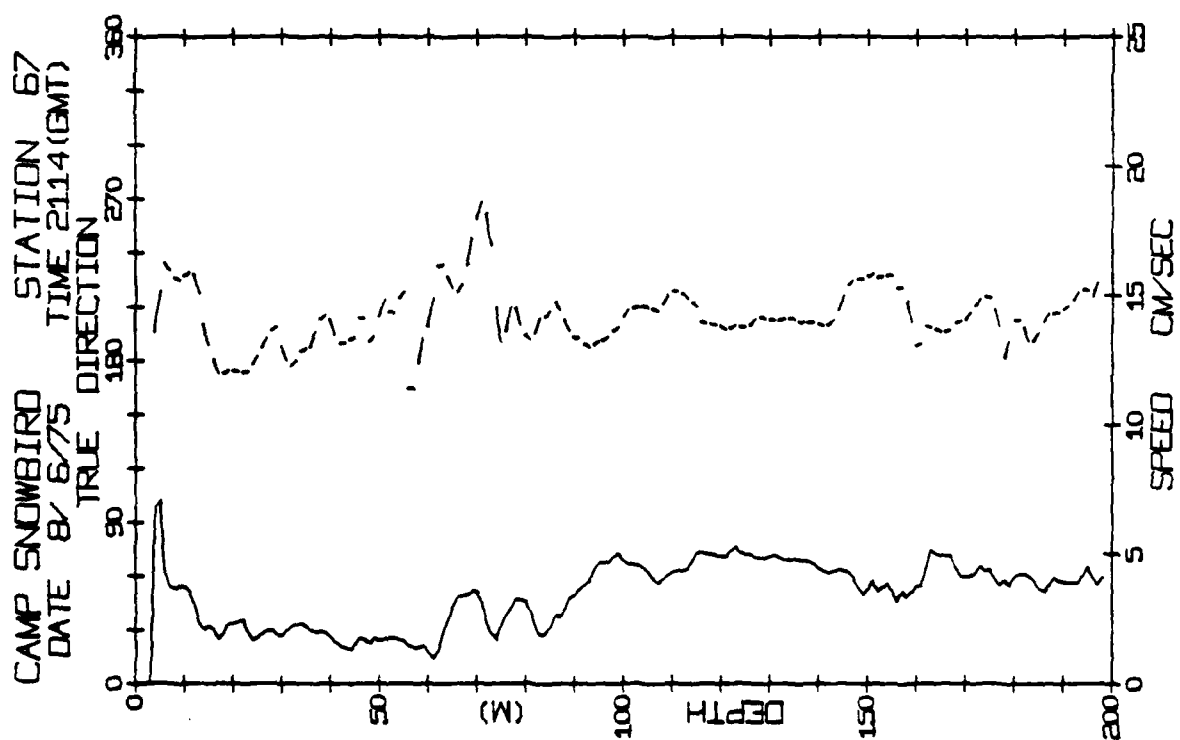
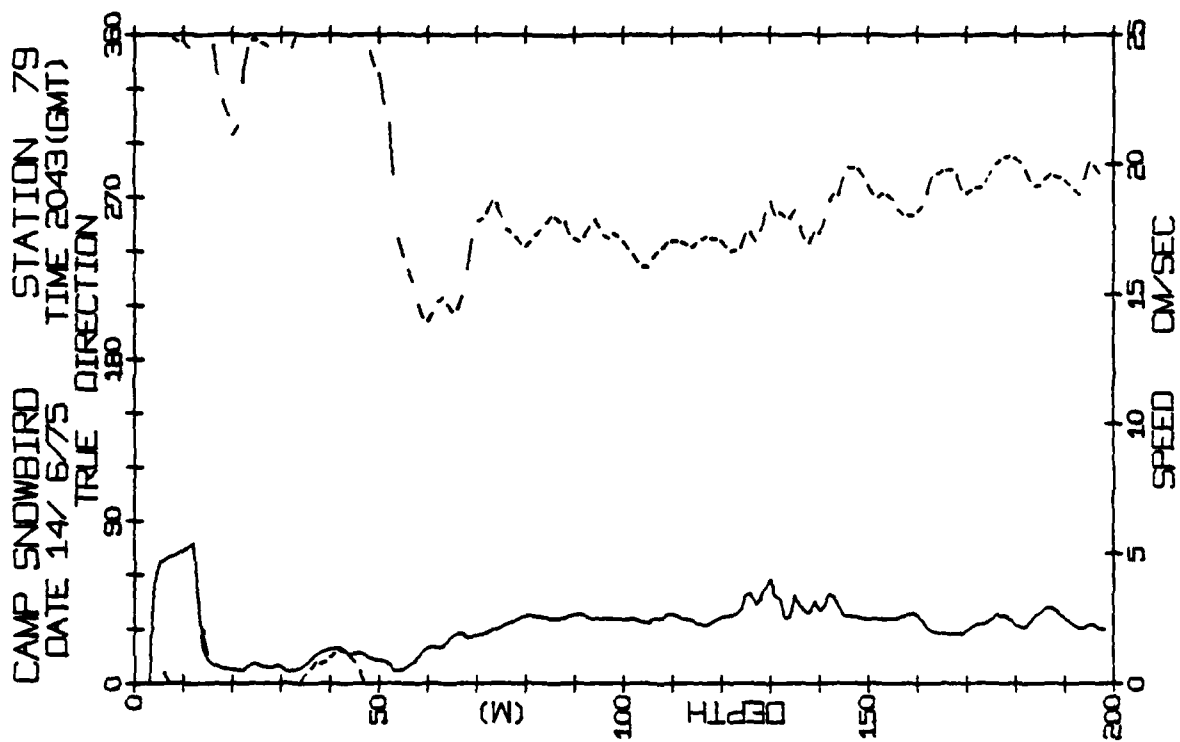
CAMP SNOWBIRD STATION 56
DATE 3/ 6/75 TIME 543(GMT)



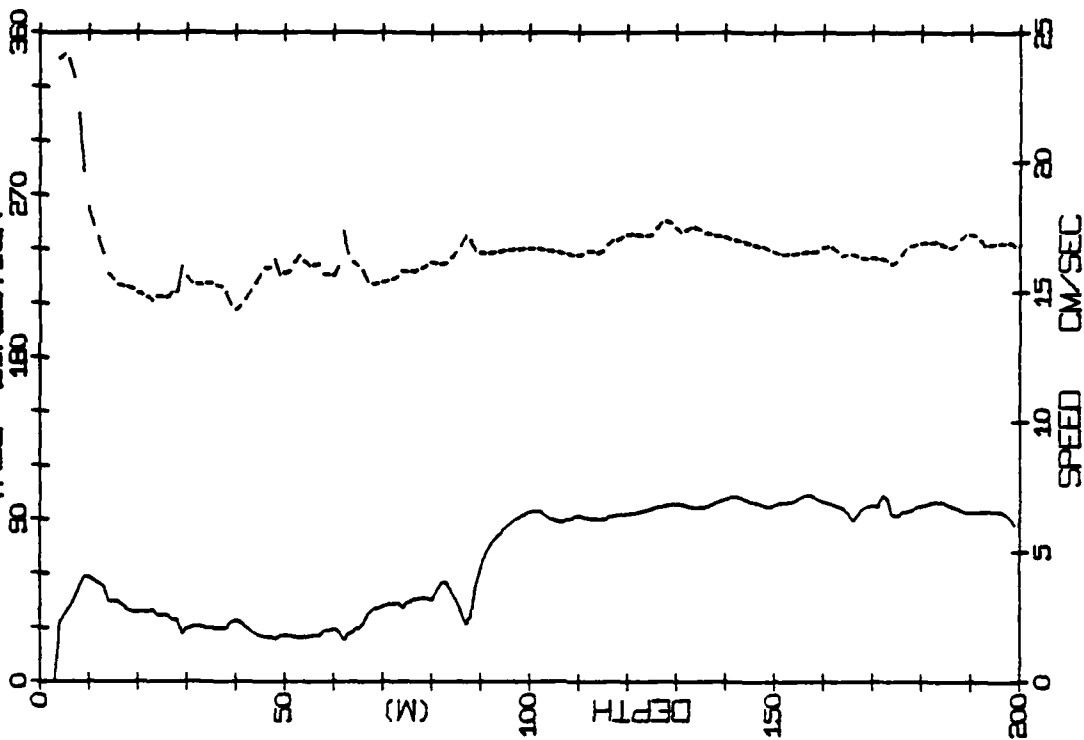




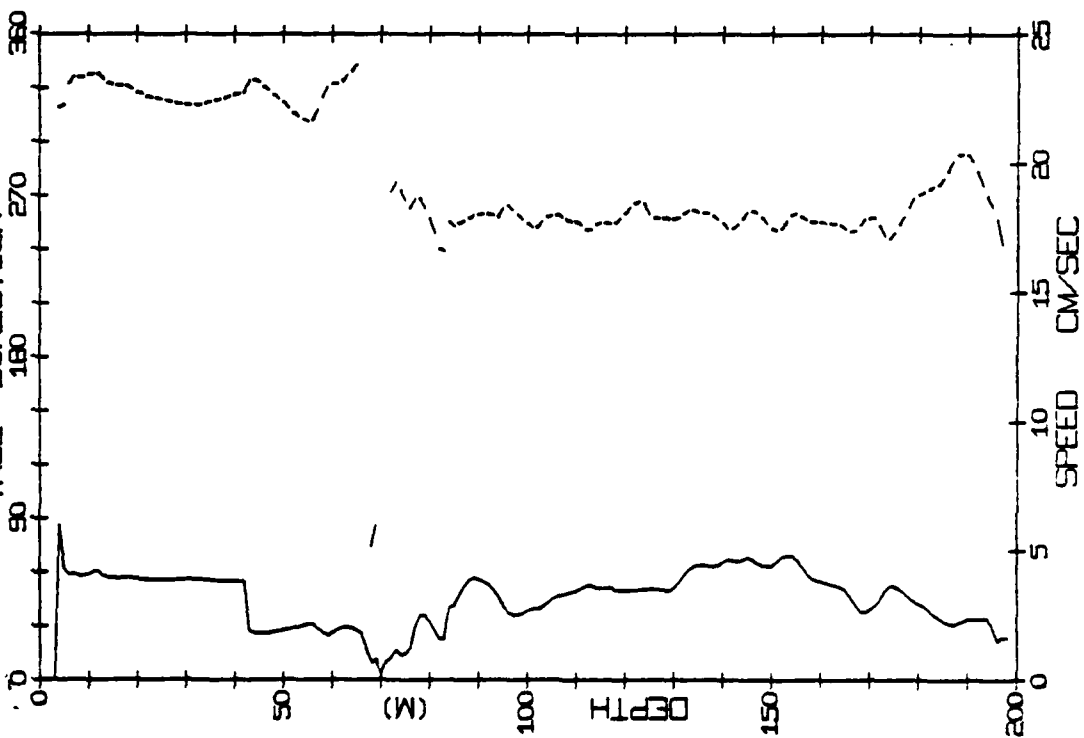


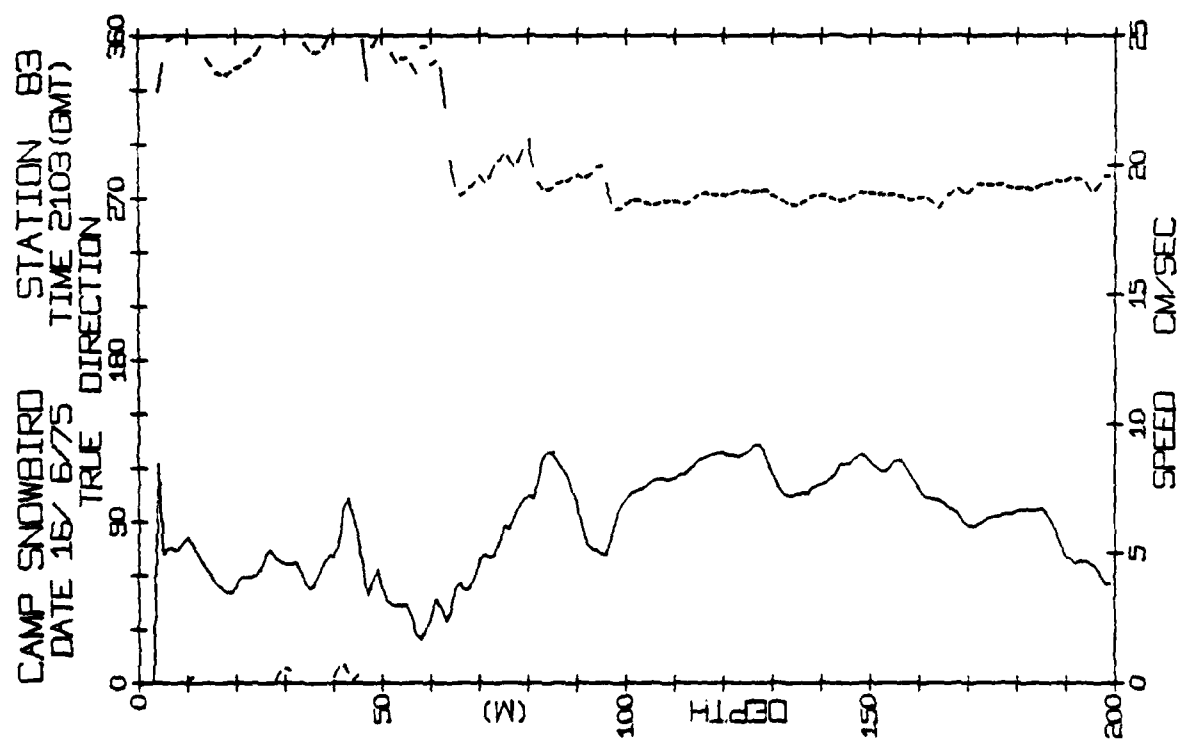
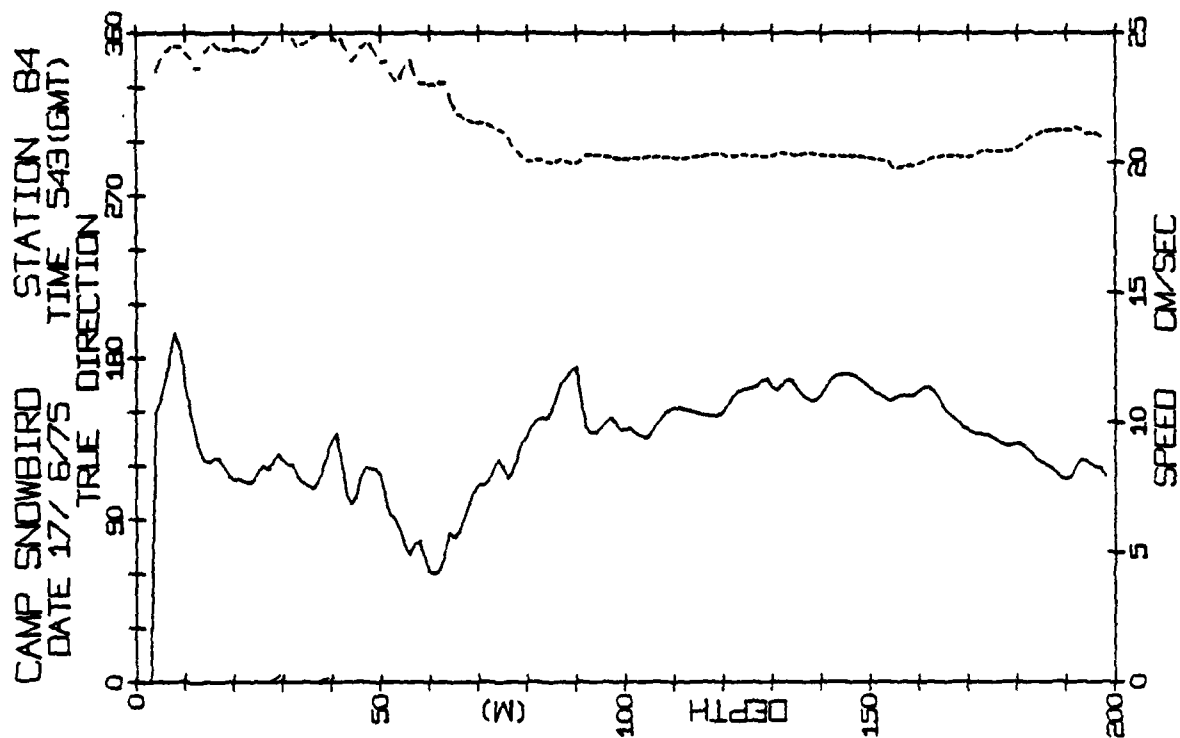


CAMP SNOWBIRD STATION 82
 DATE 16/ 6/75 TIME 544 (GMT)
 TRUE DIRECTION

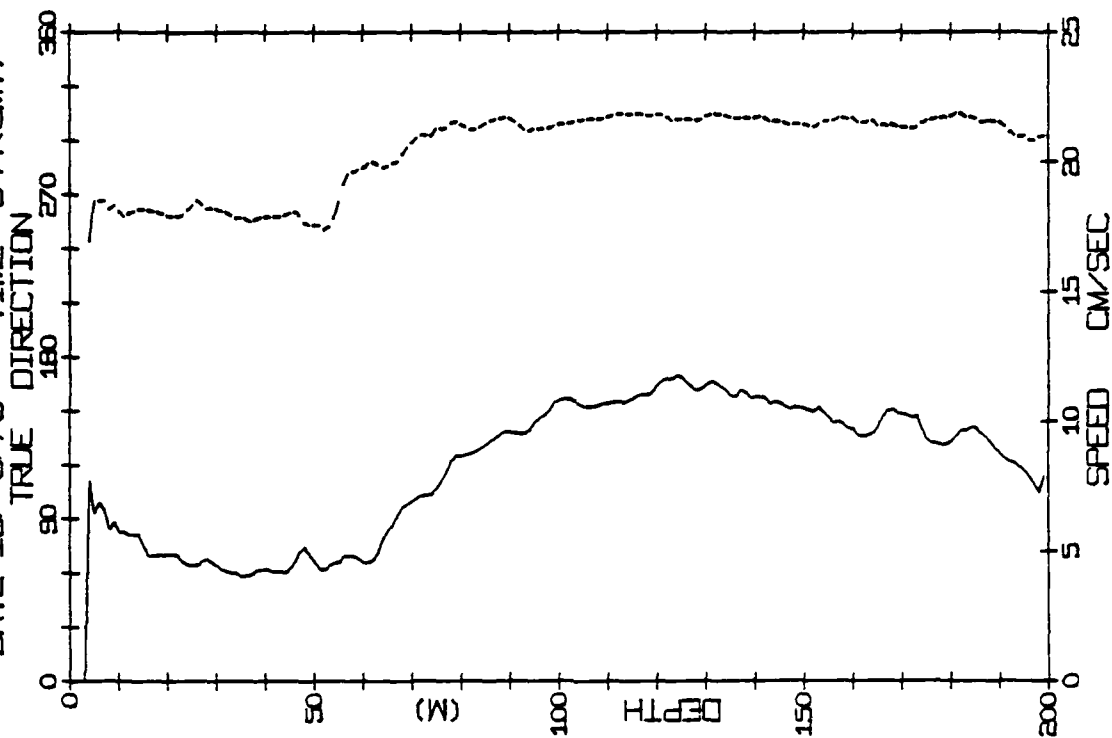


CAMP SNOWBIRD STATION 80
 DATE 15/ 6/75 TIME 558 (GMT)
 TRUE DIRECTION

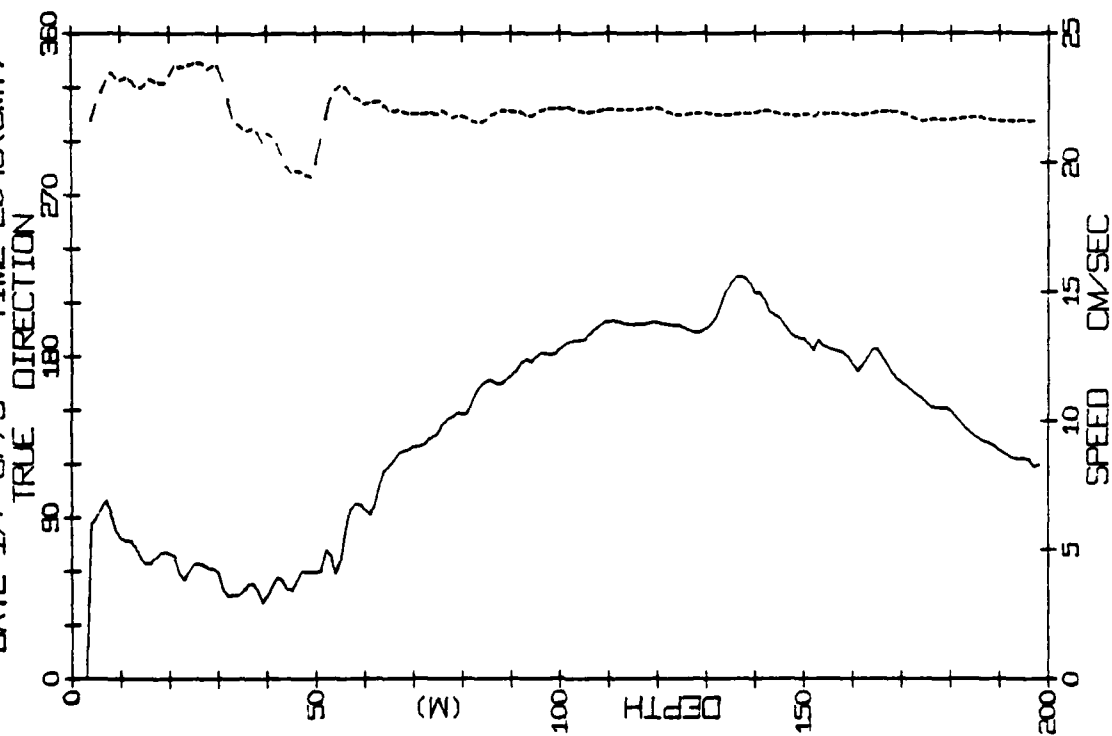


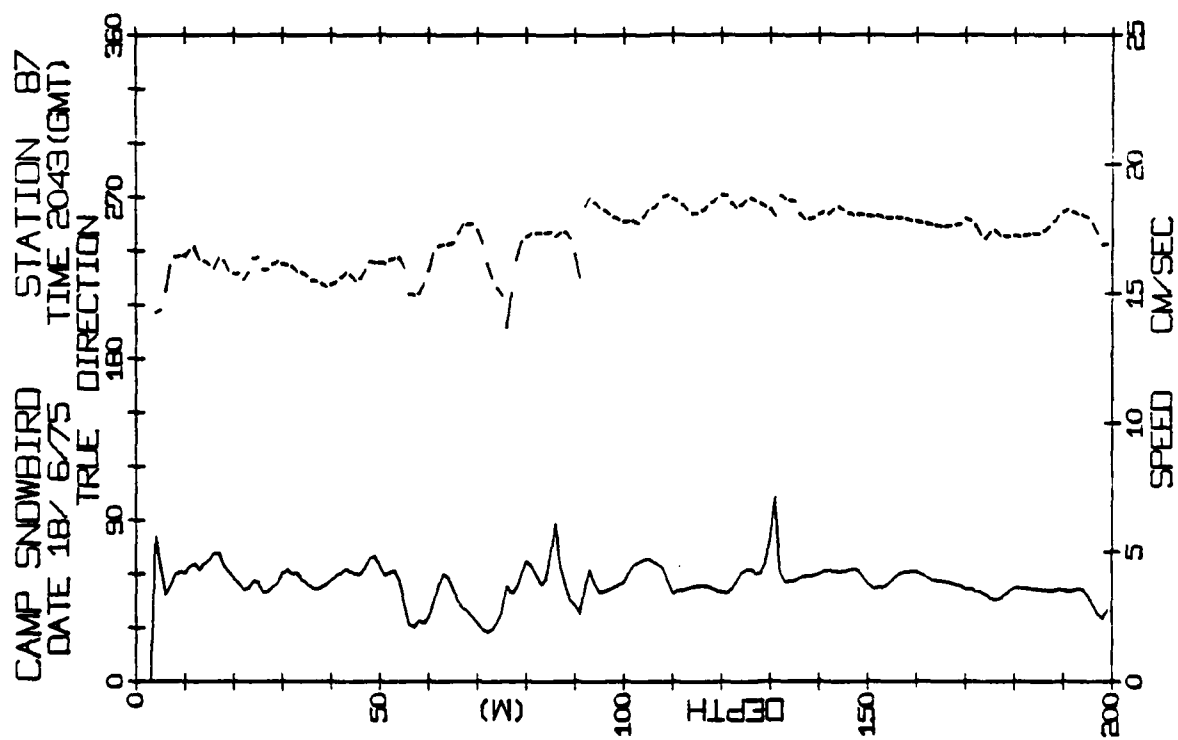
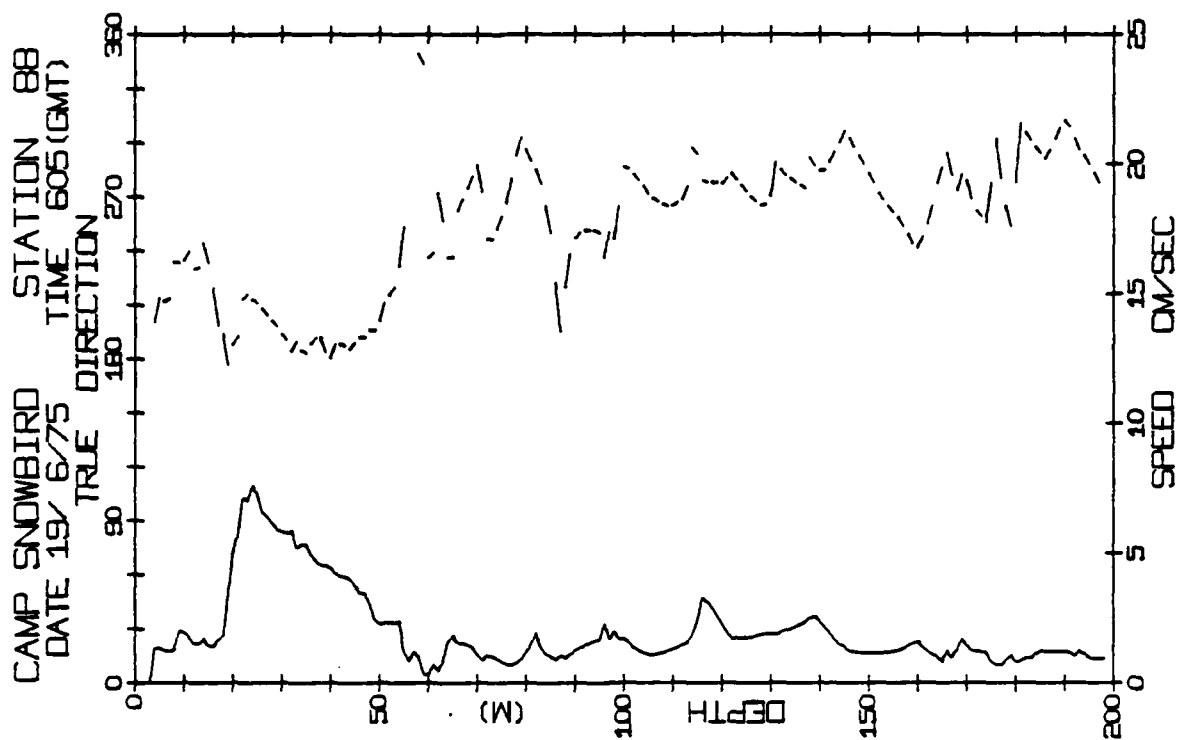


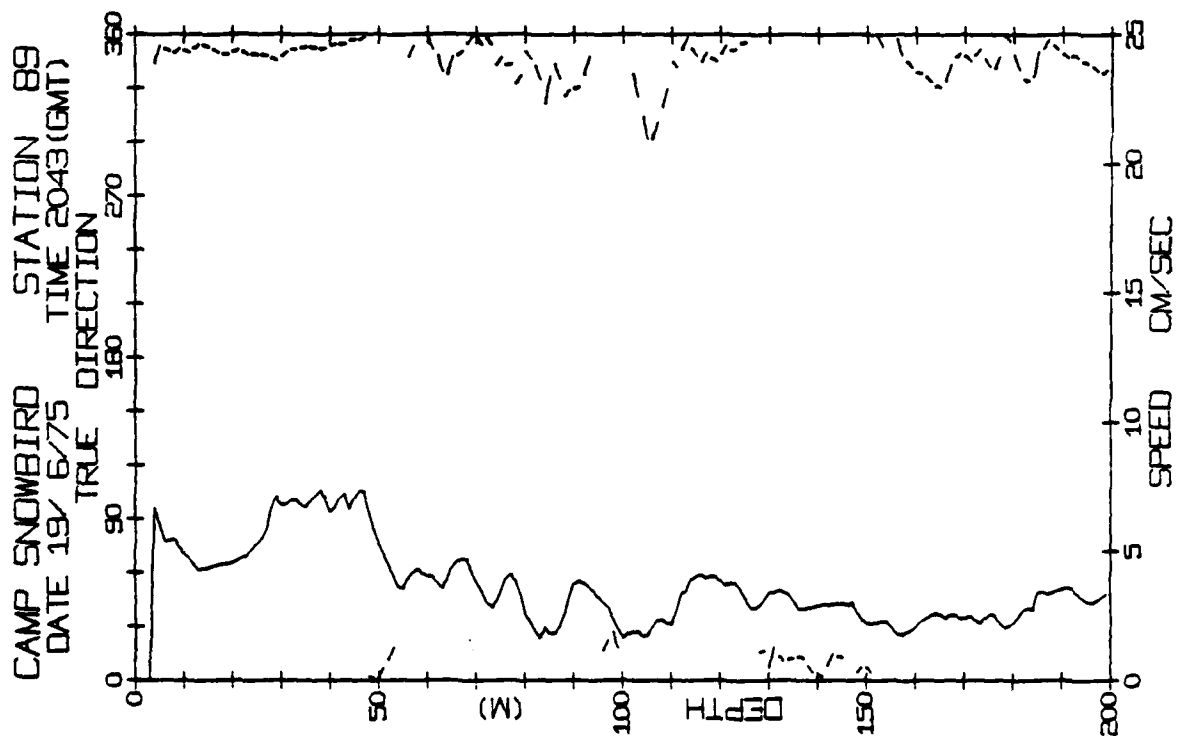
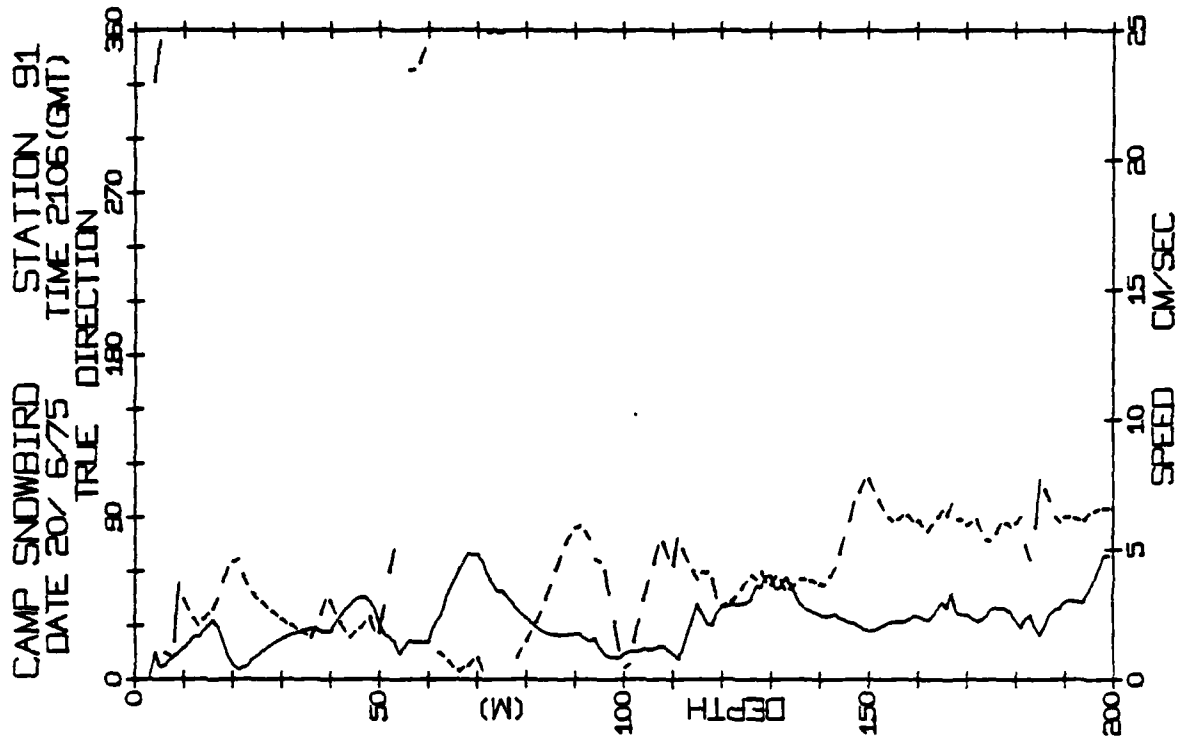
CAMP SNOWBIRD STATION 86
DATE 18/ 6/75 TIME 544 (GMT)



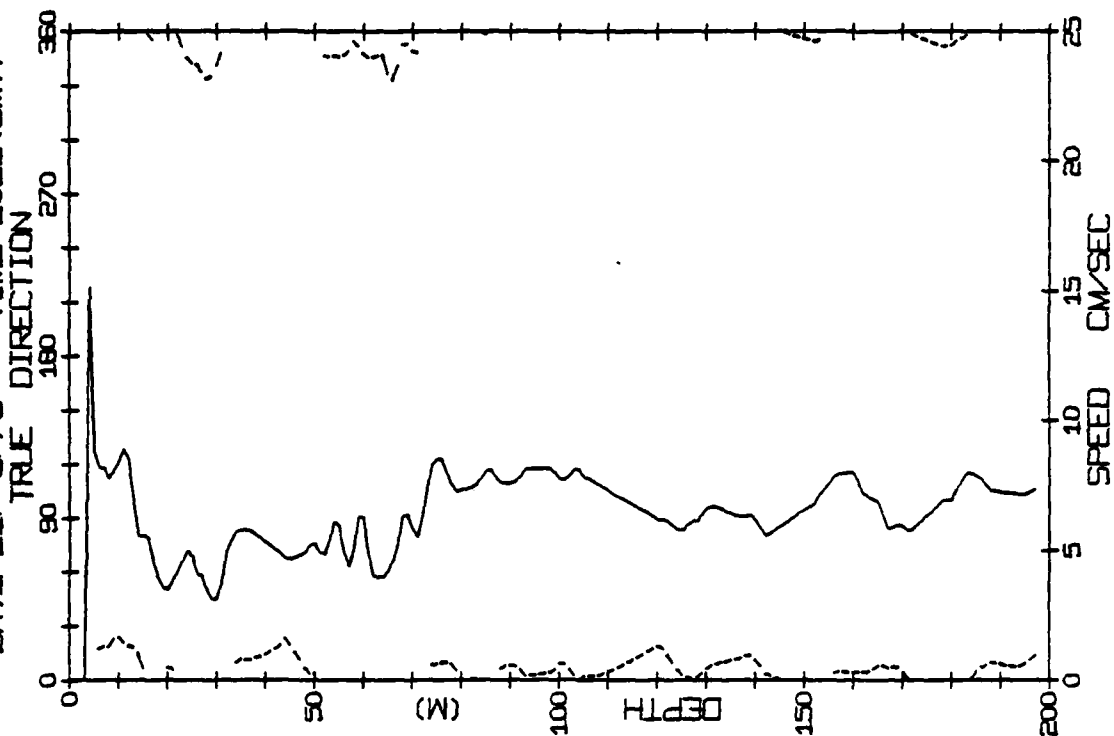
CAMP SNOWBIRD STATION 85
DATE 17/ 6/75 TIME 2043 (GMT)



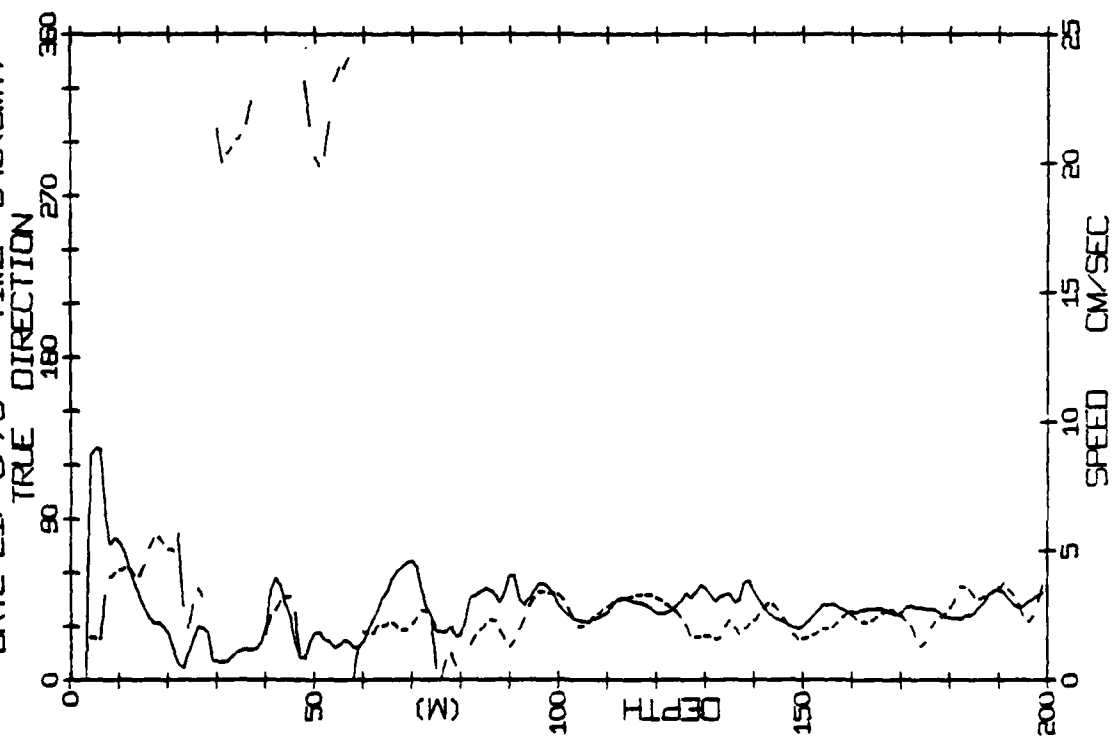


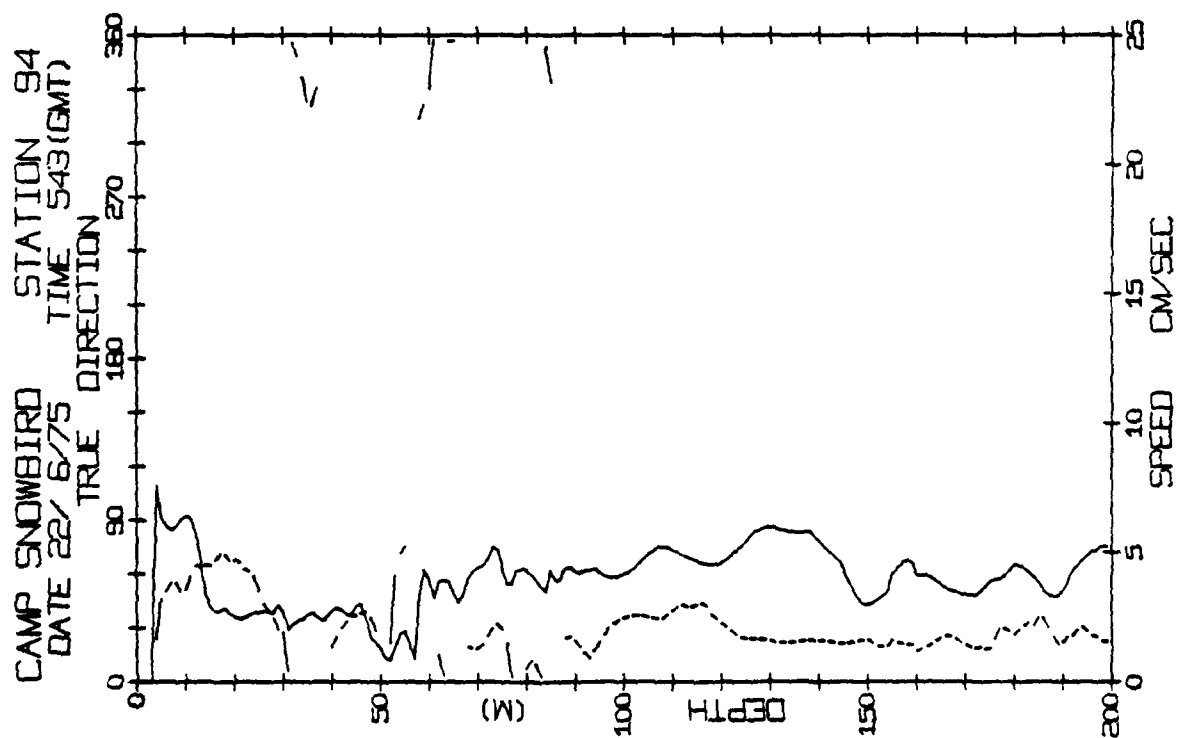
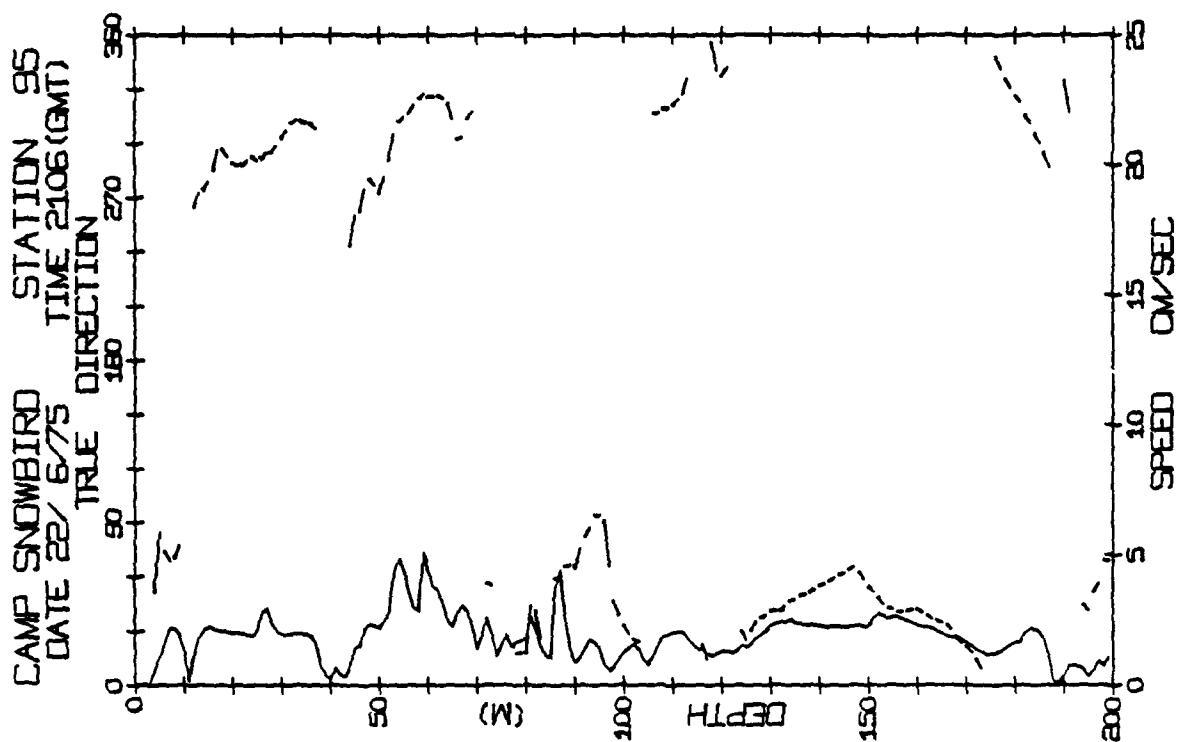


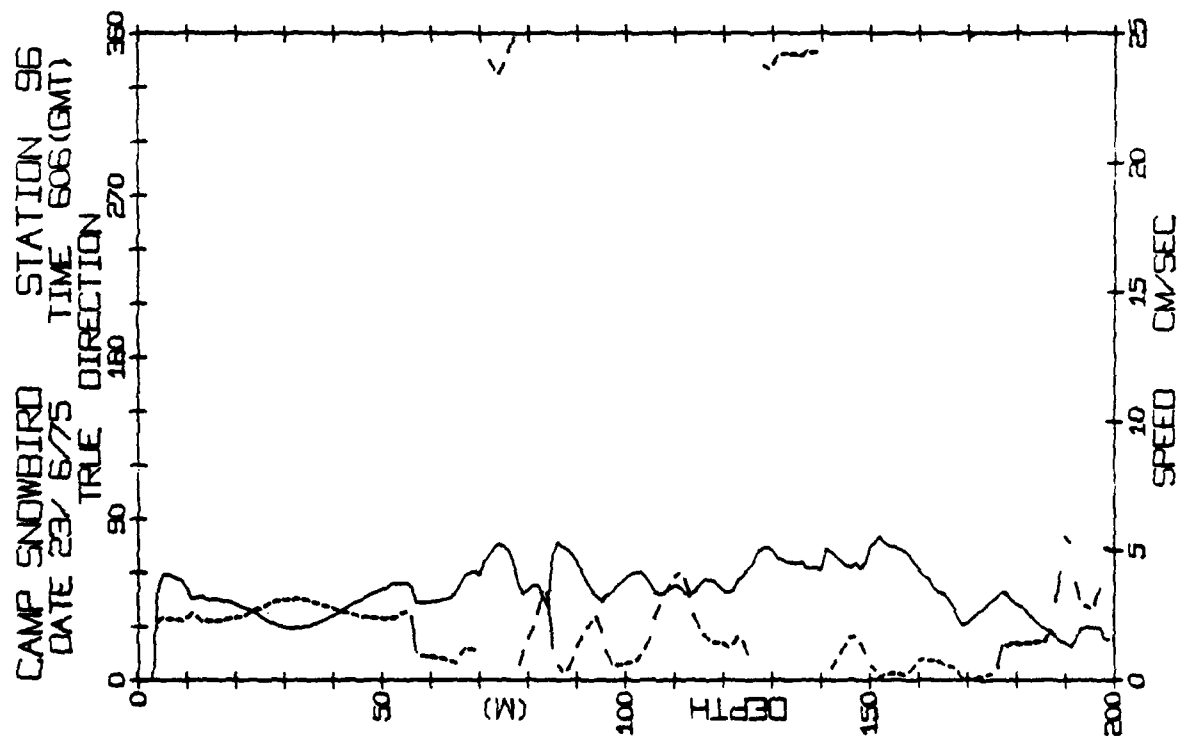
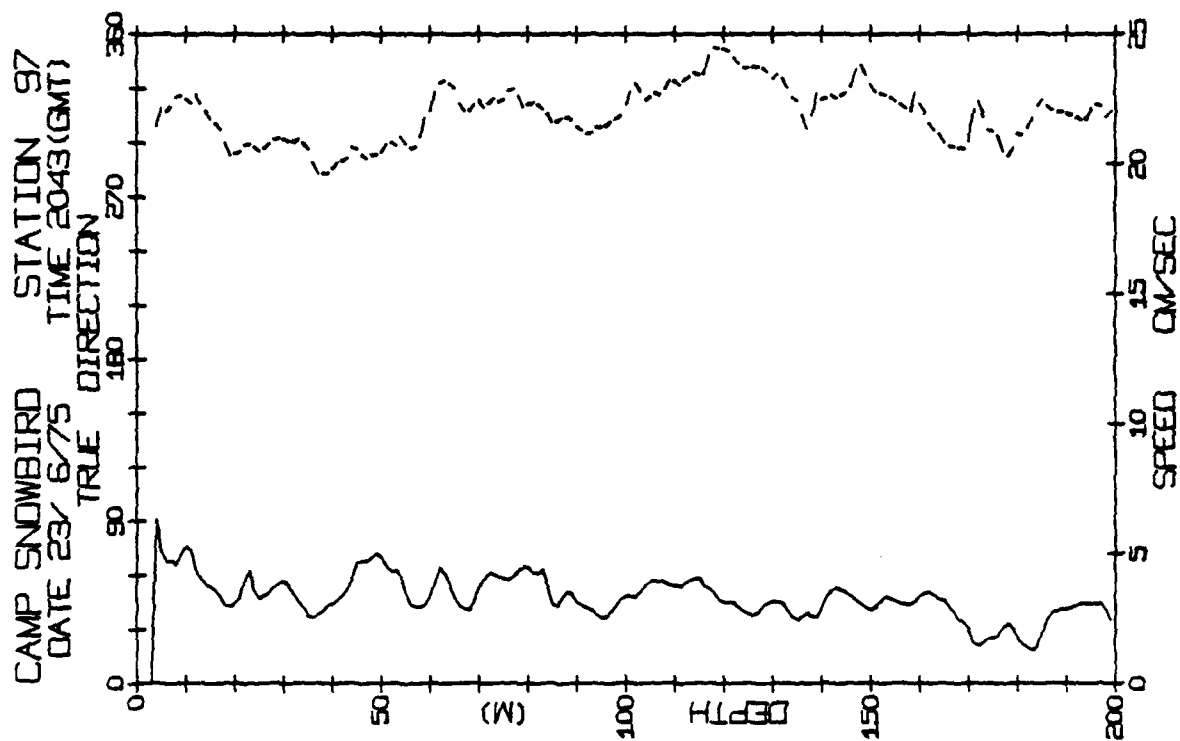
CAMP SNOWBIRD STATION 93
DATE 21/ 6/75 TIME 2021(GMT)

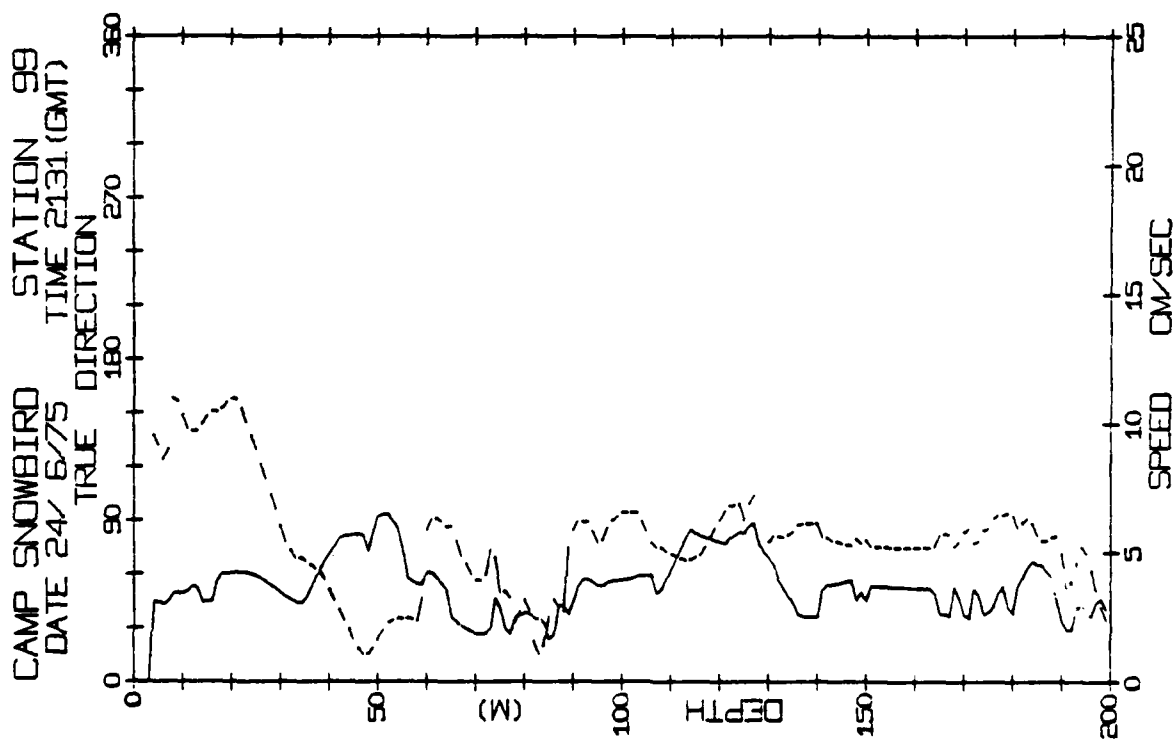
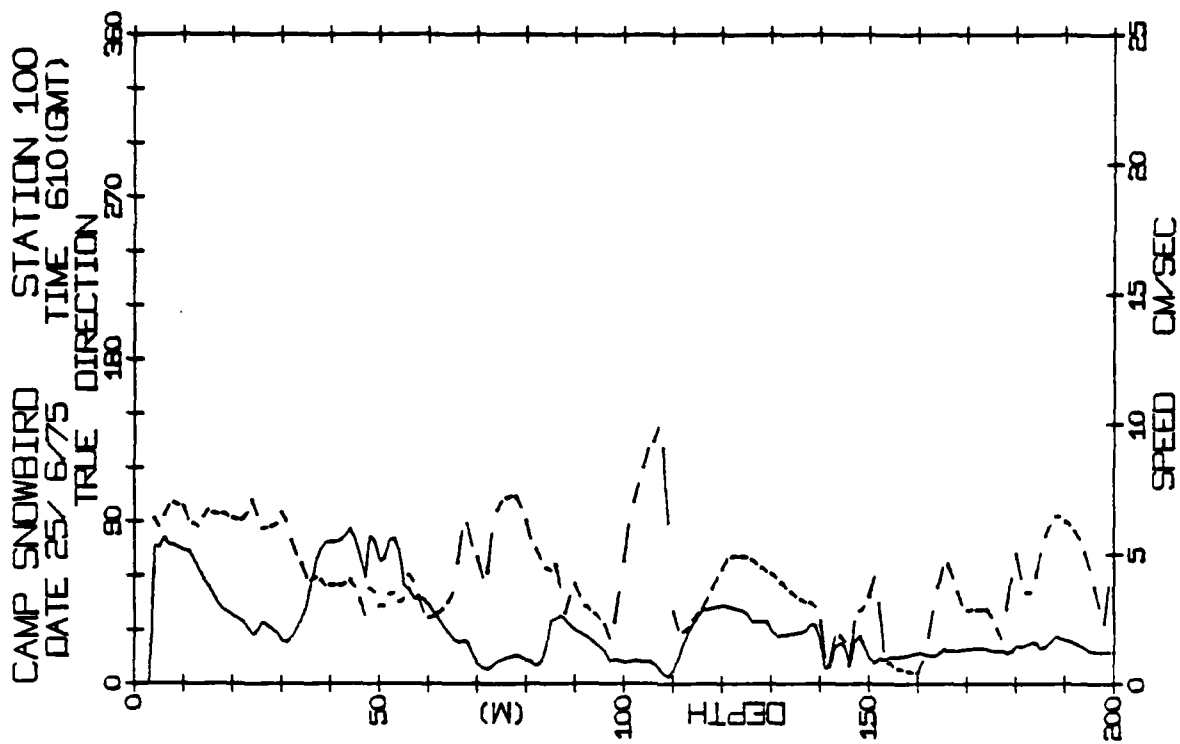


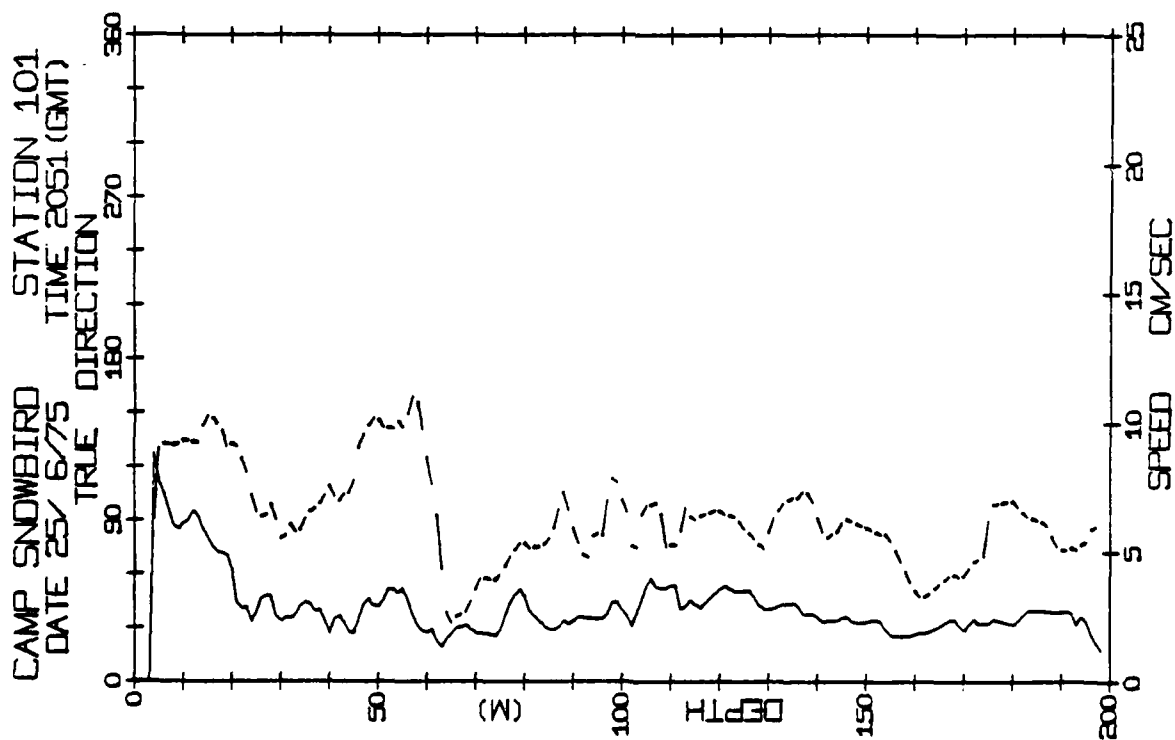
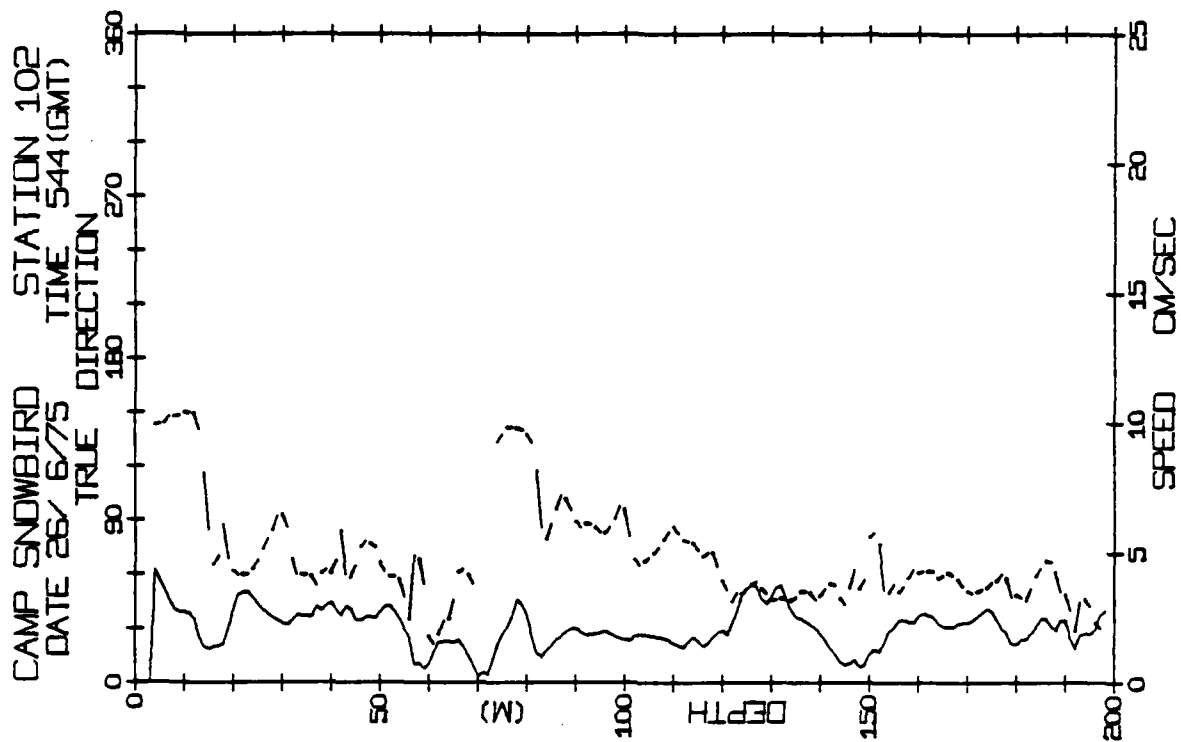
CAMP SNOWBIRD STATION 92
DATE 21/ 6/75 TIME 543(GMT)

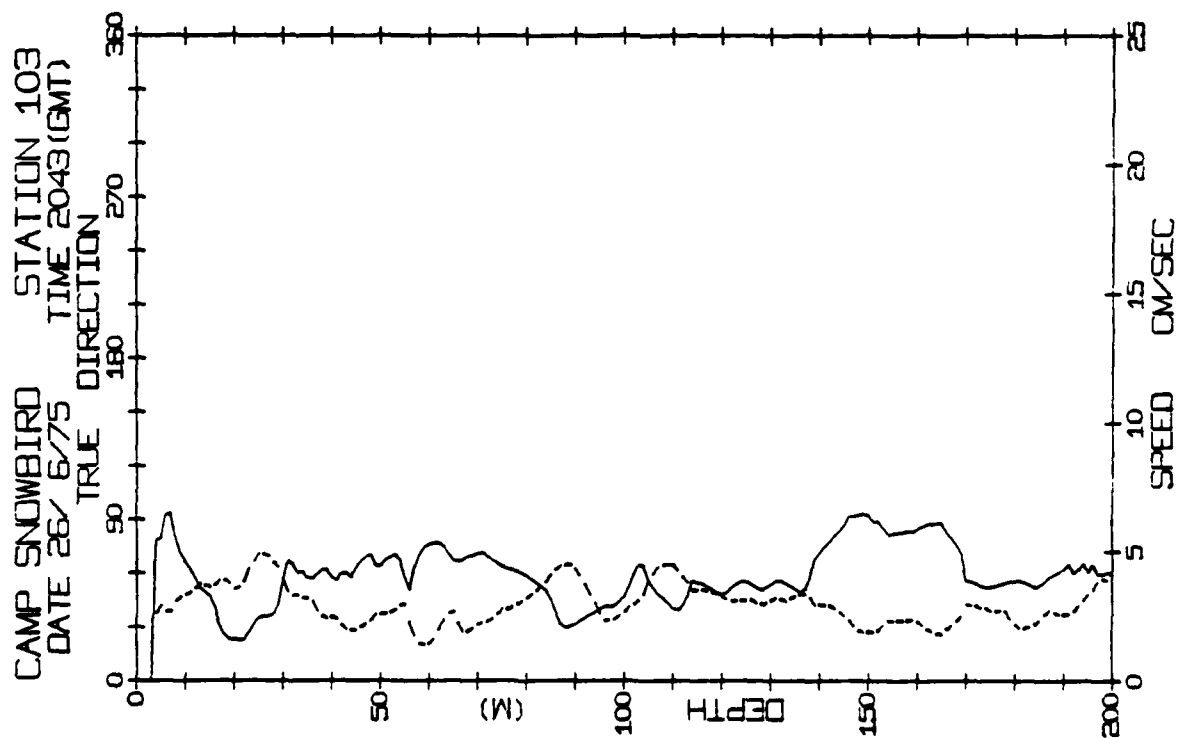
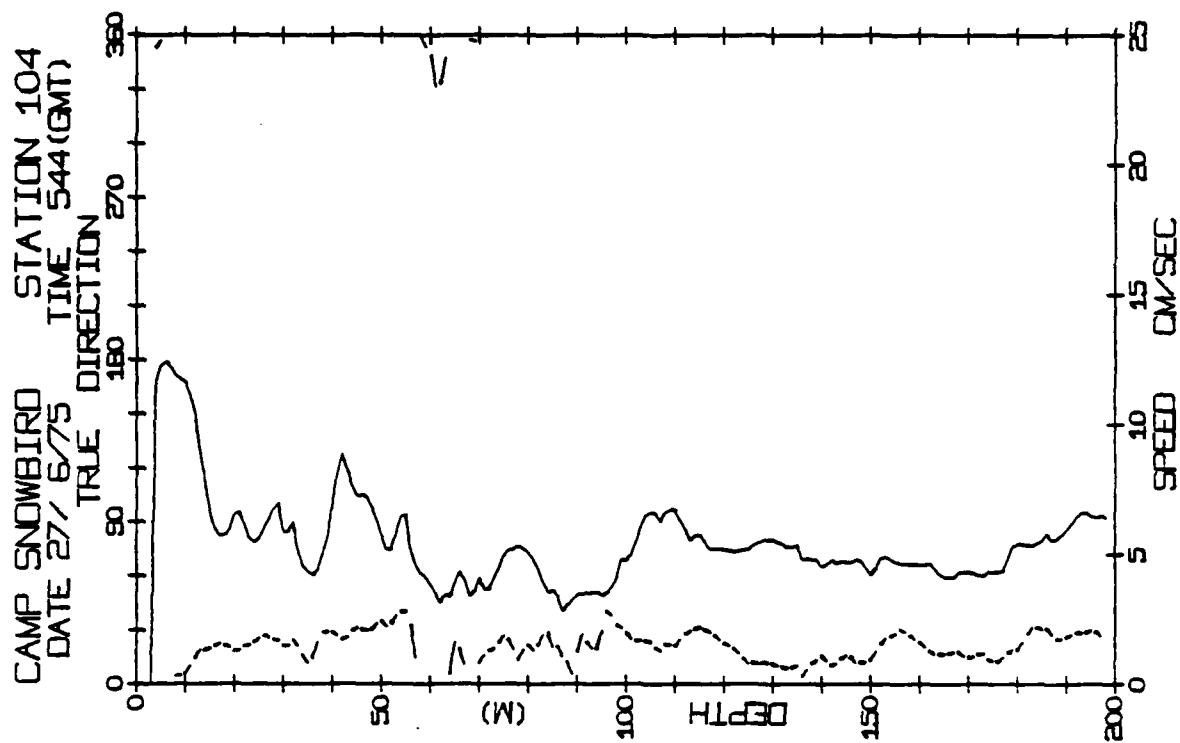


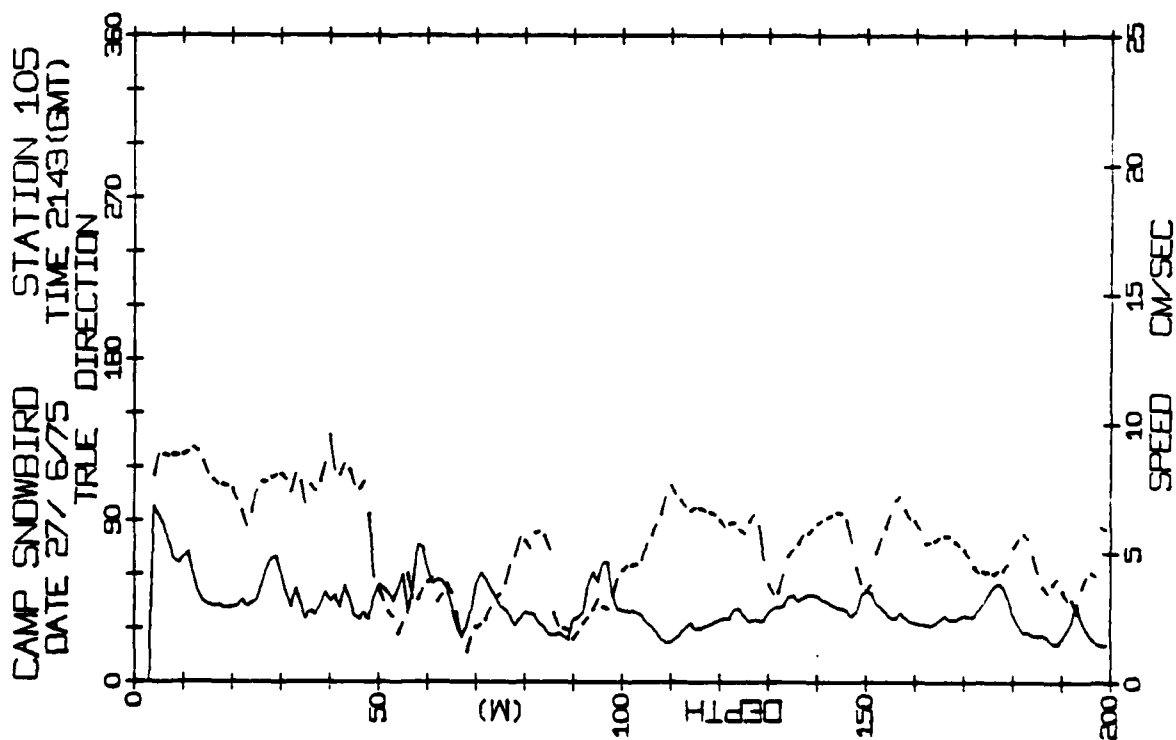
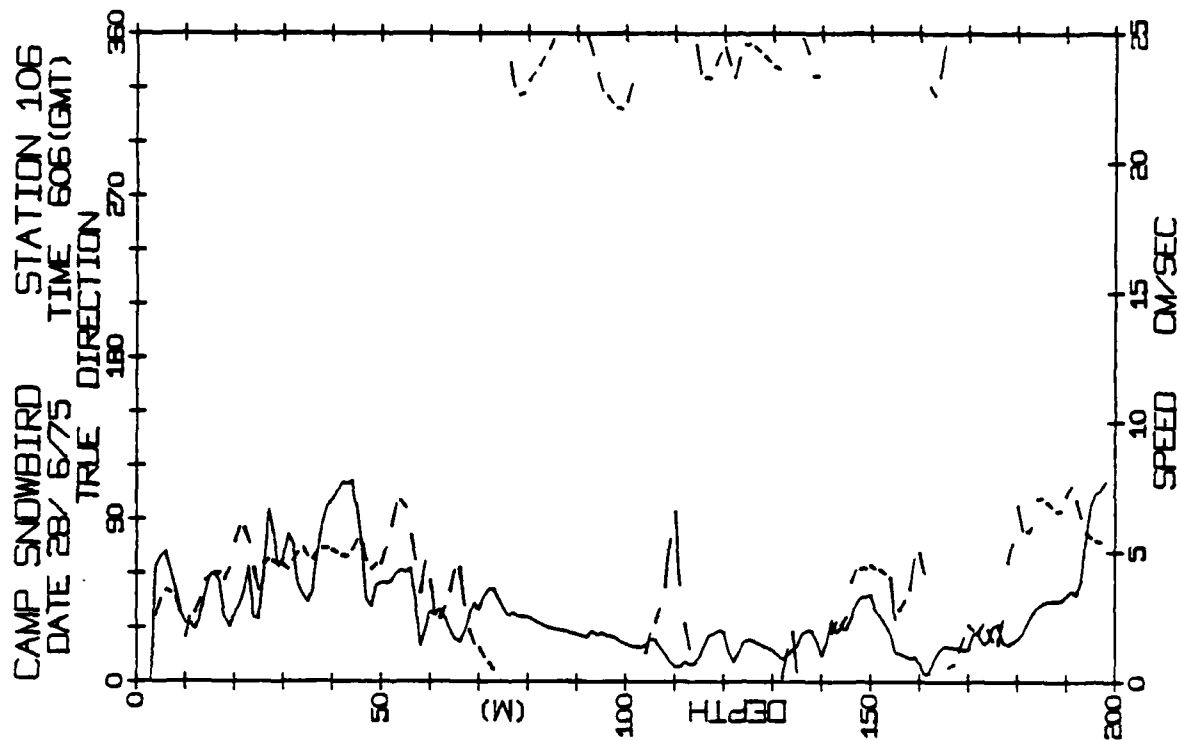




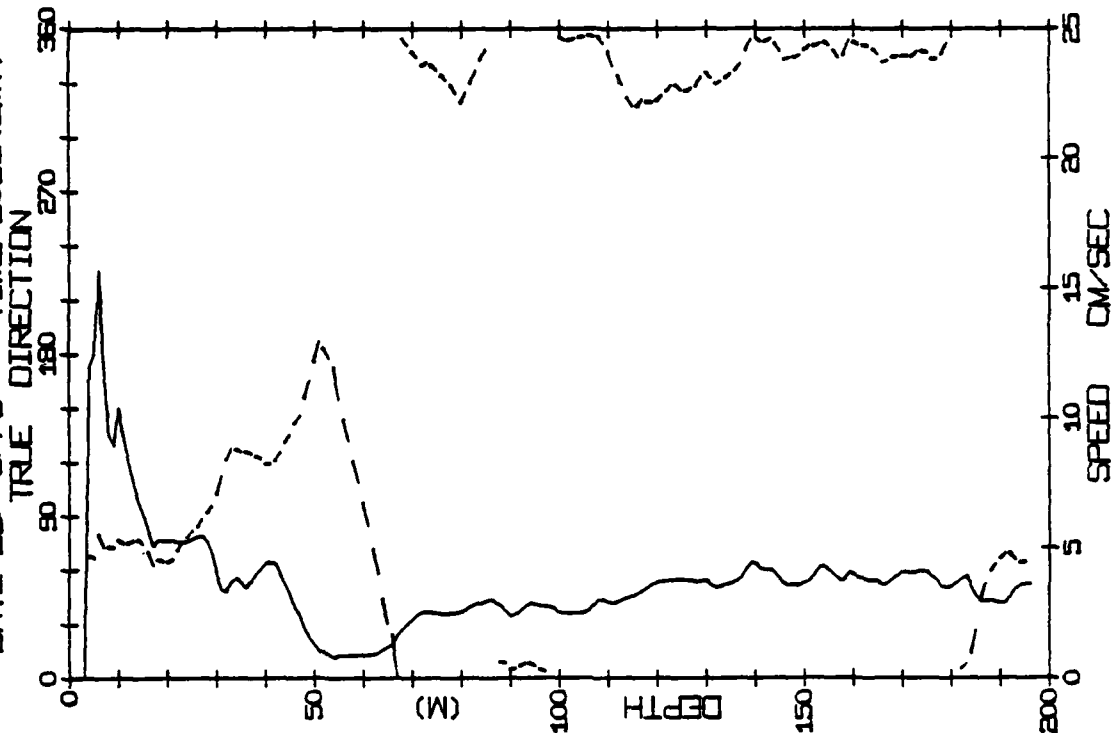




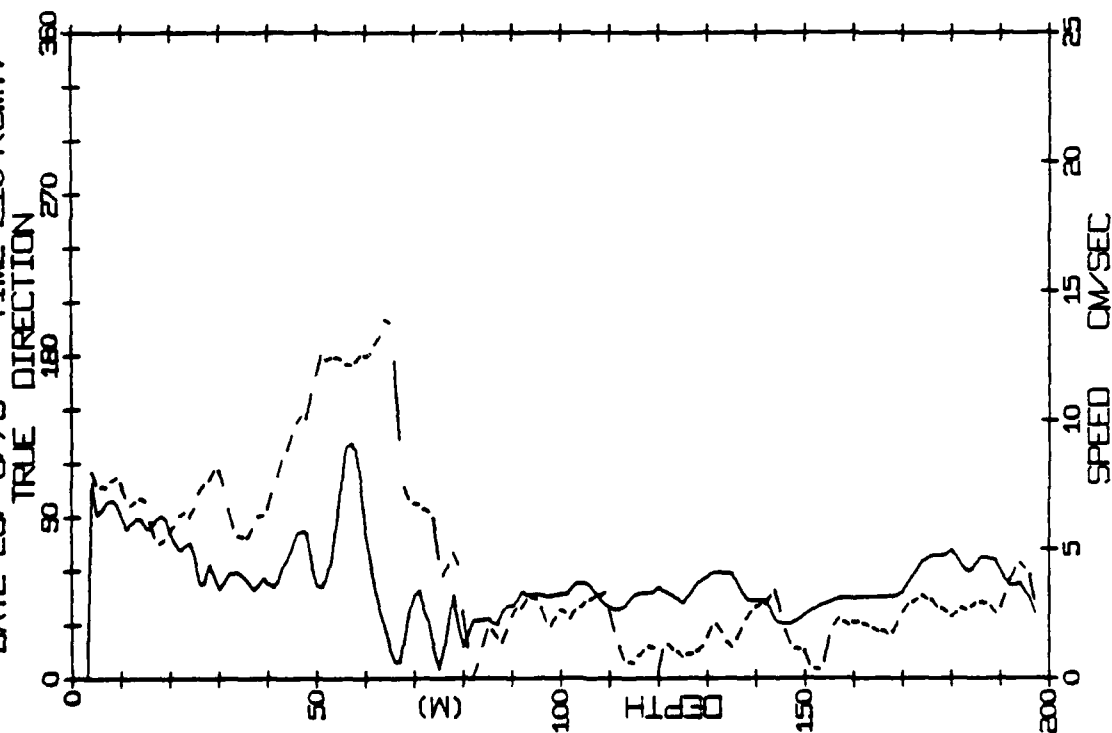




CAMP SNOWBIRD STATION 109
 DATE 28/ 6/75 TIME 2051(GMT)



CAMP SNOWBIRD STATION 107
 DATE 28/ 6/75 TIME 2104(GMT)

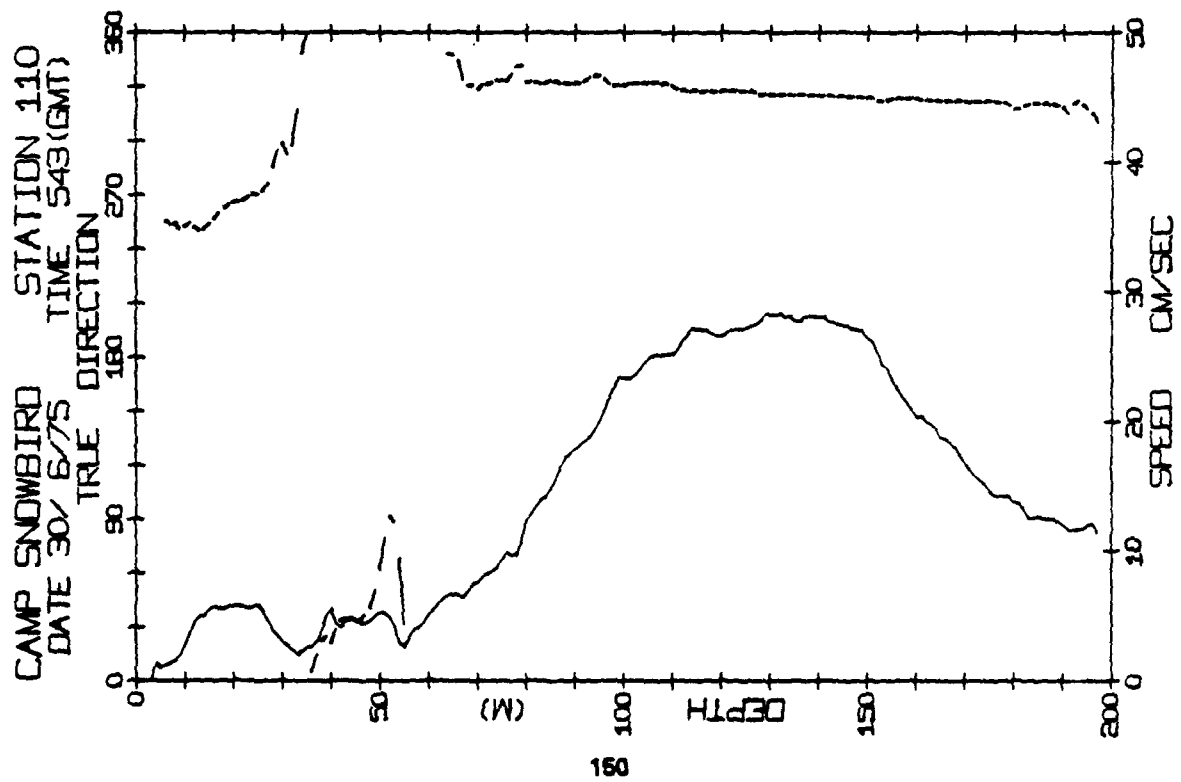
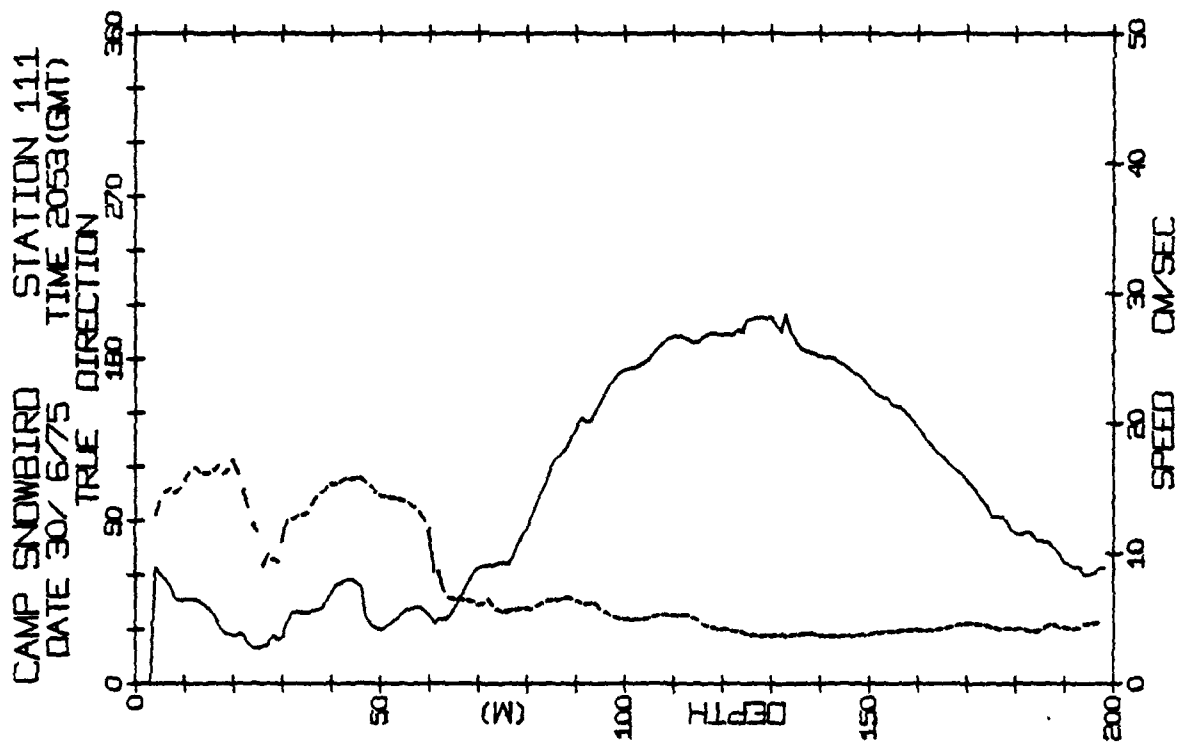


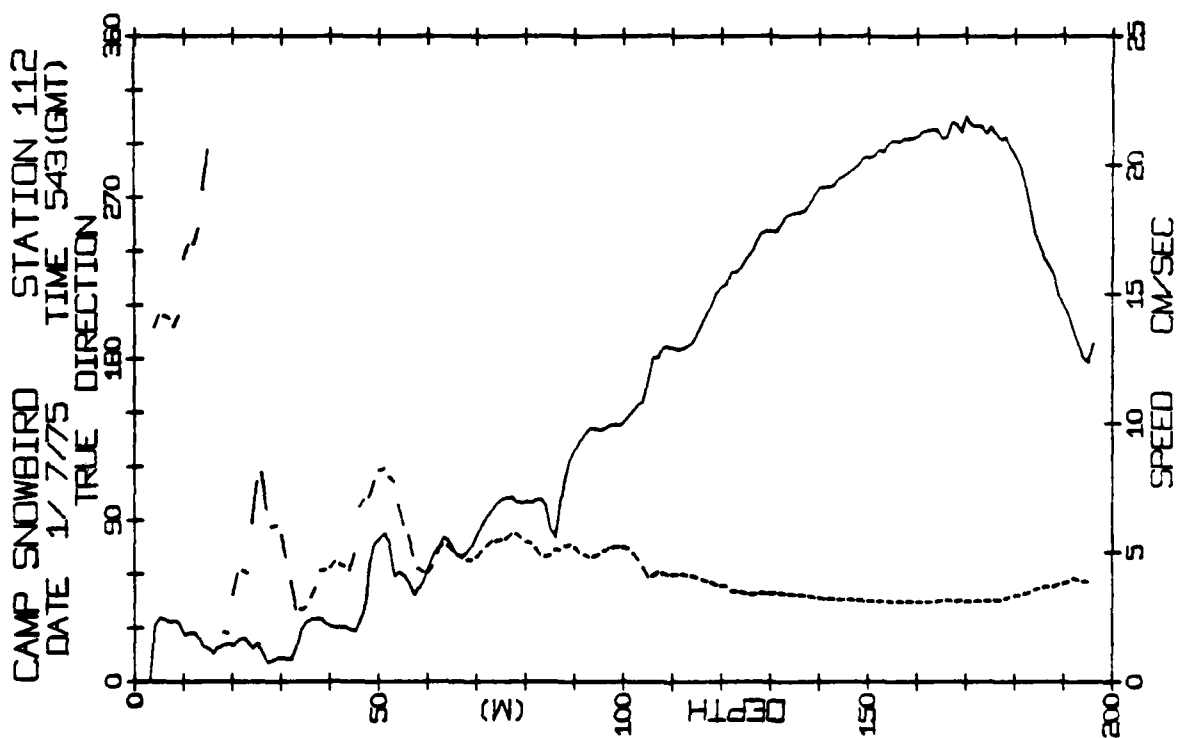
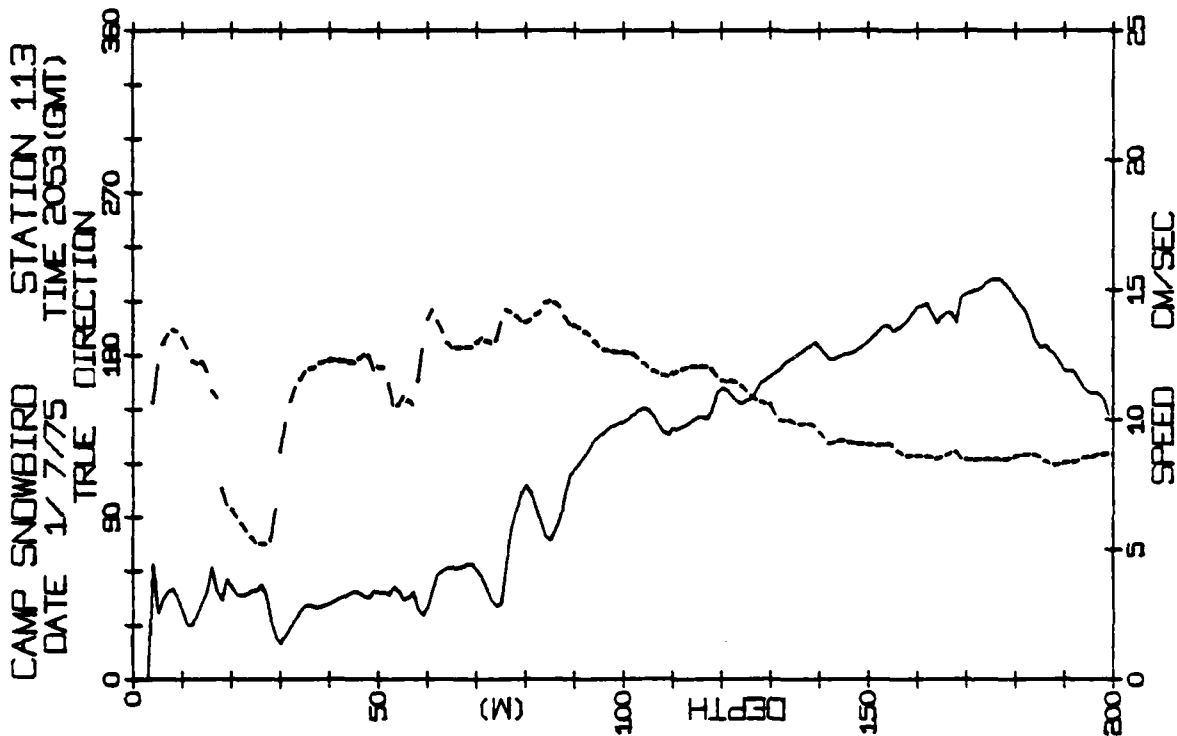
```

SNOWBIRD STATION 107      (197M )      28/JUN/75      2104 GMT
LAT= 76 59.34N      LONG= 152 39.49W      LTER= 1      LGER= 2
NLEVEL= -2 1      ELEVEL= 15 8      NVER= 0      EVER= 0

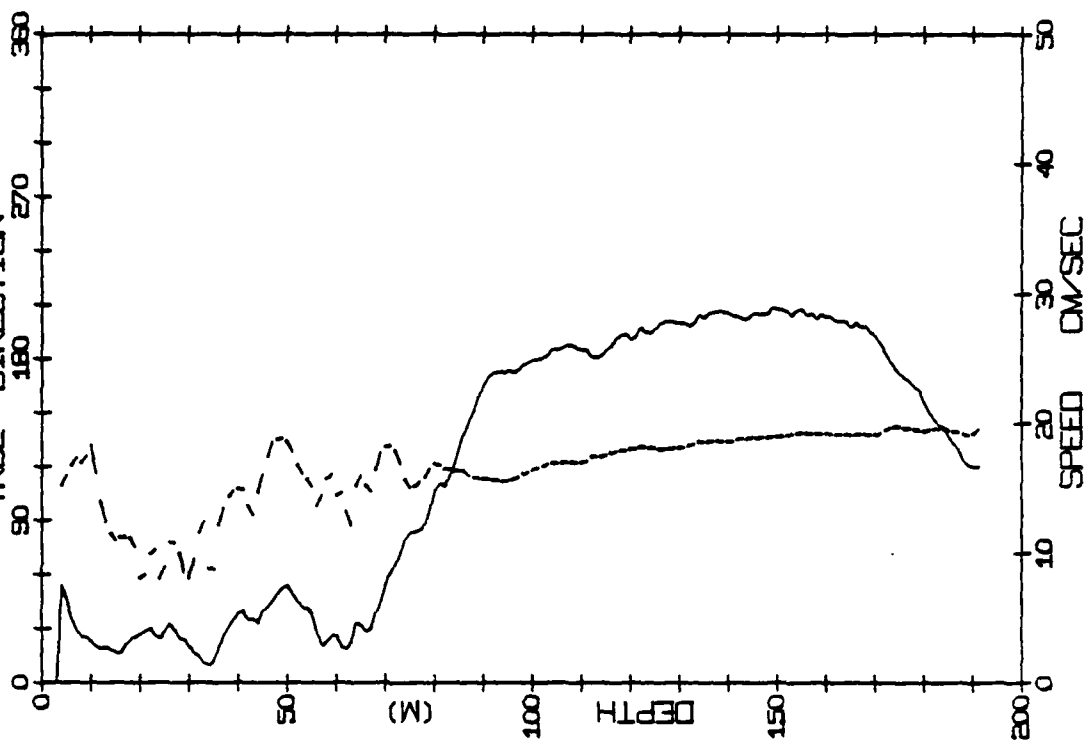
```

[illegible]

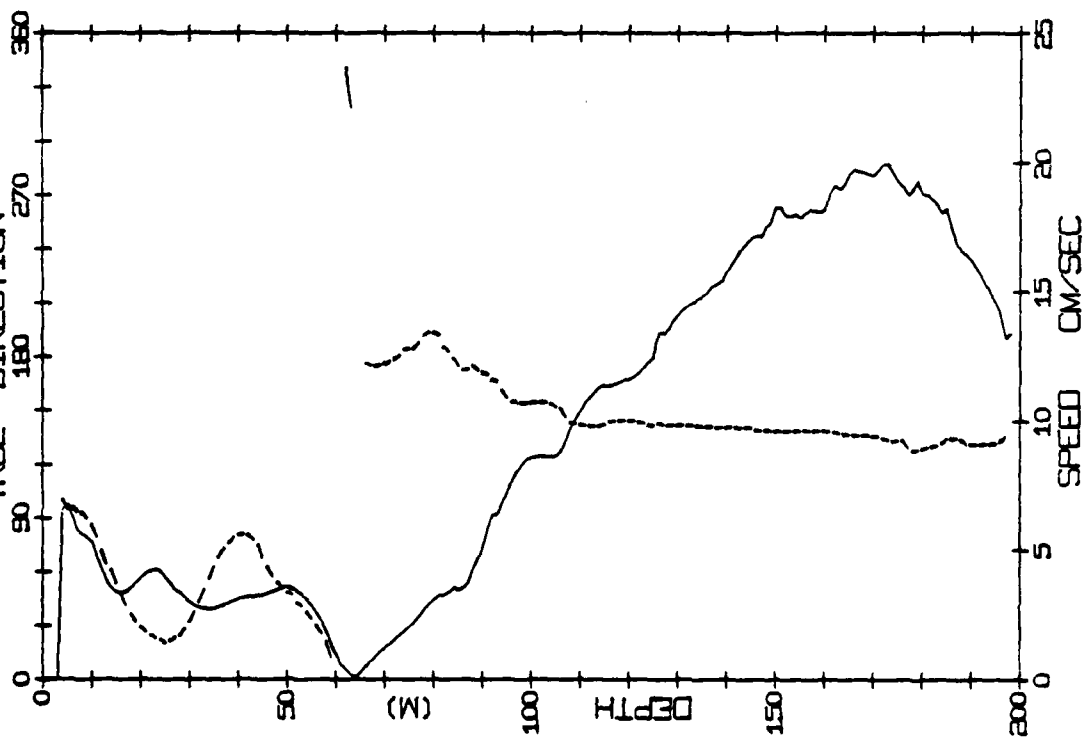


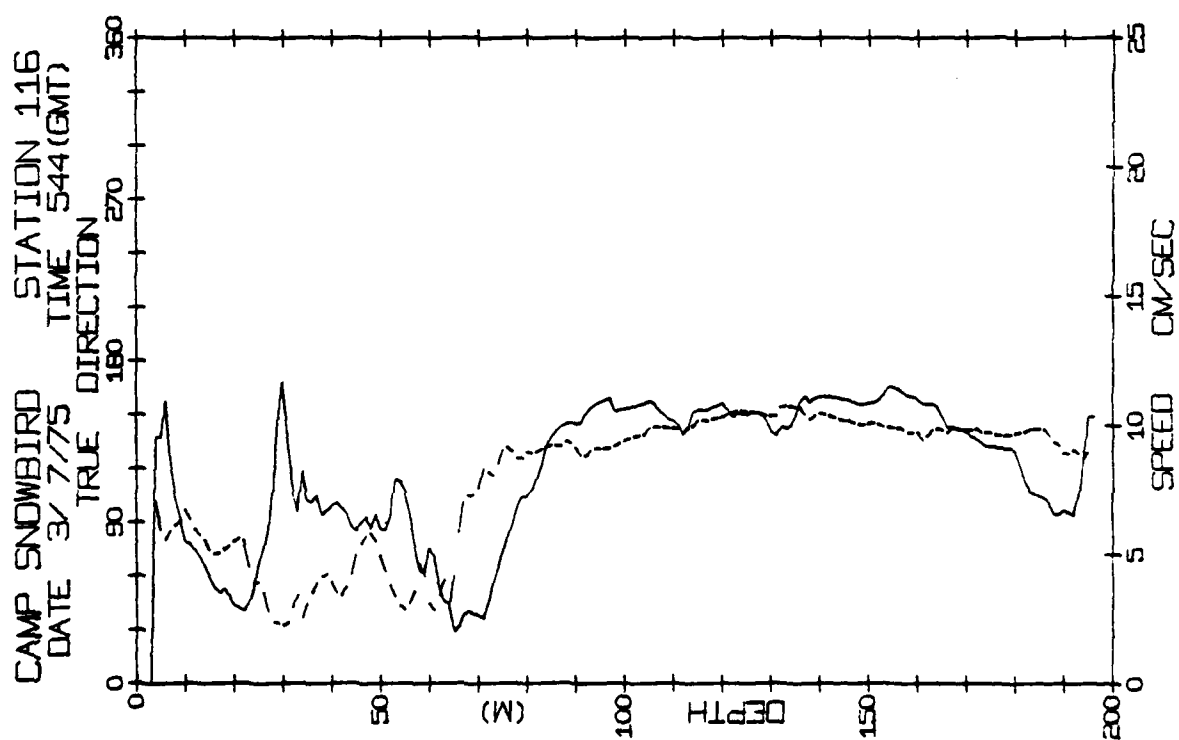
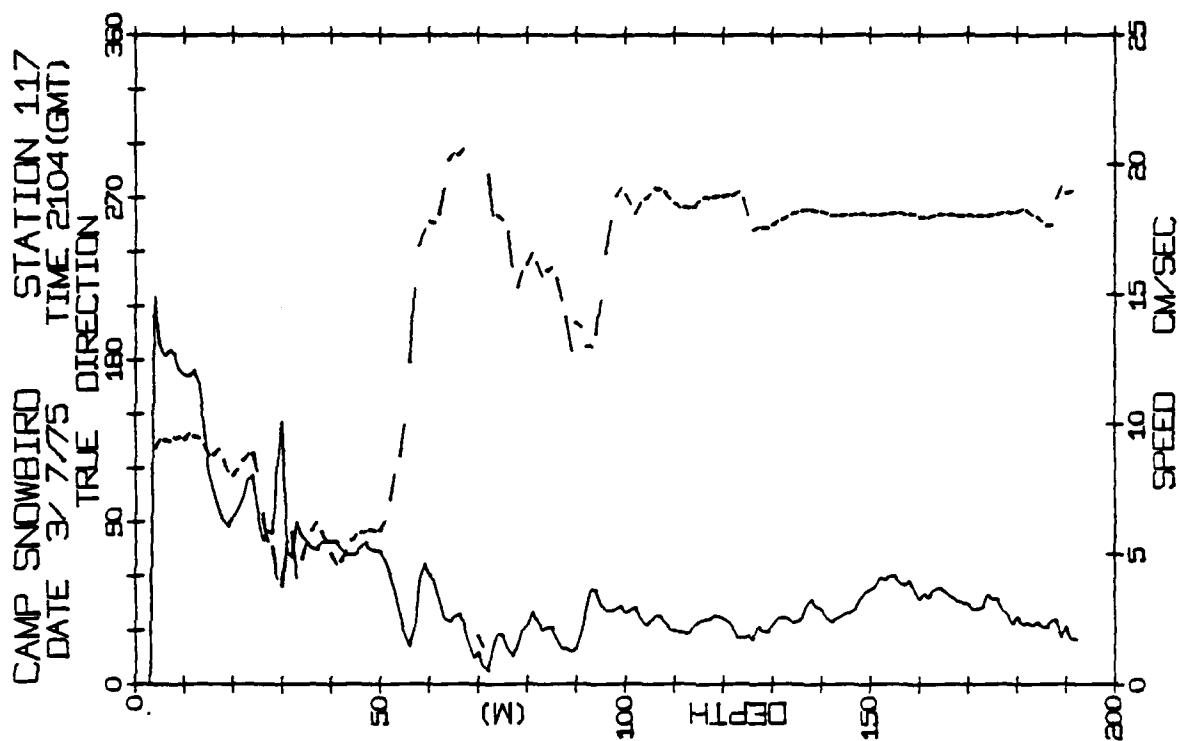


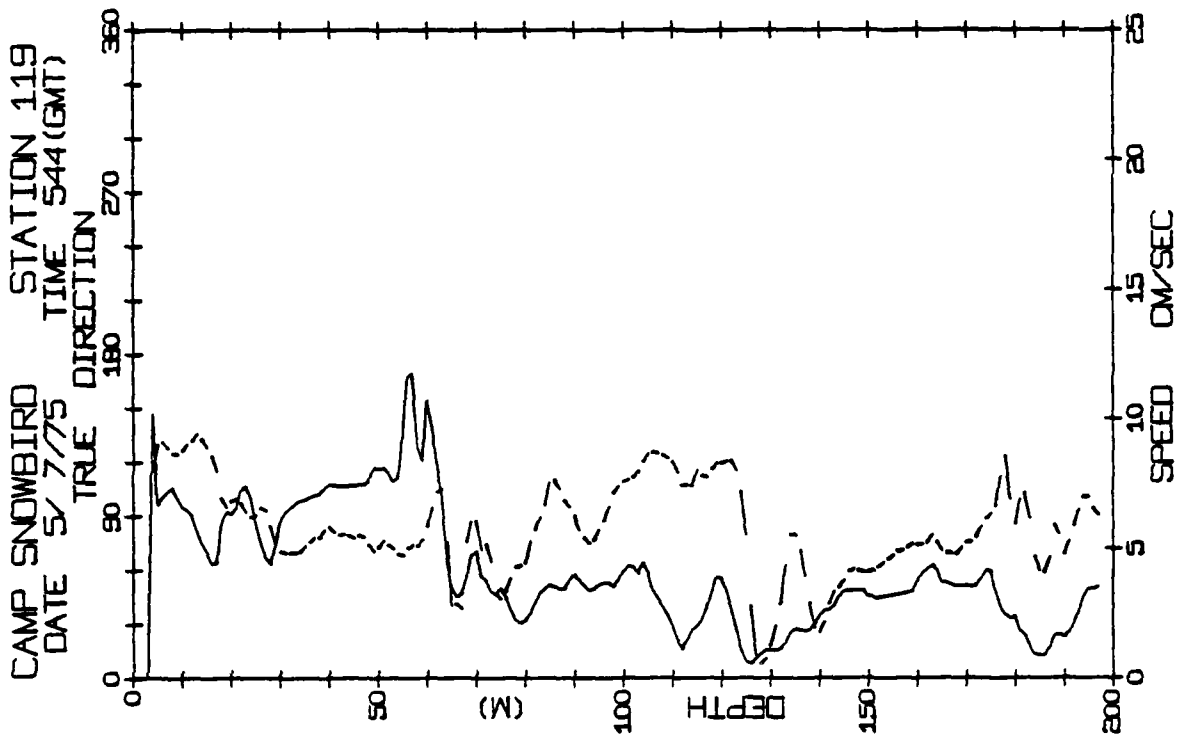
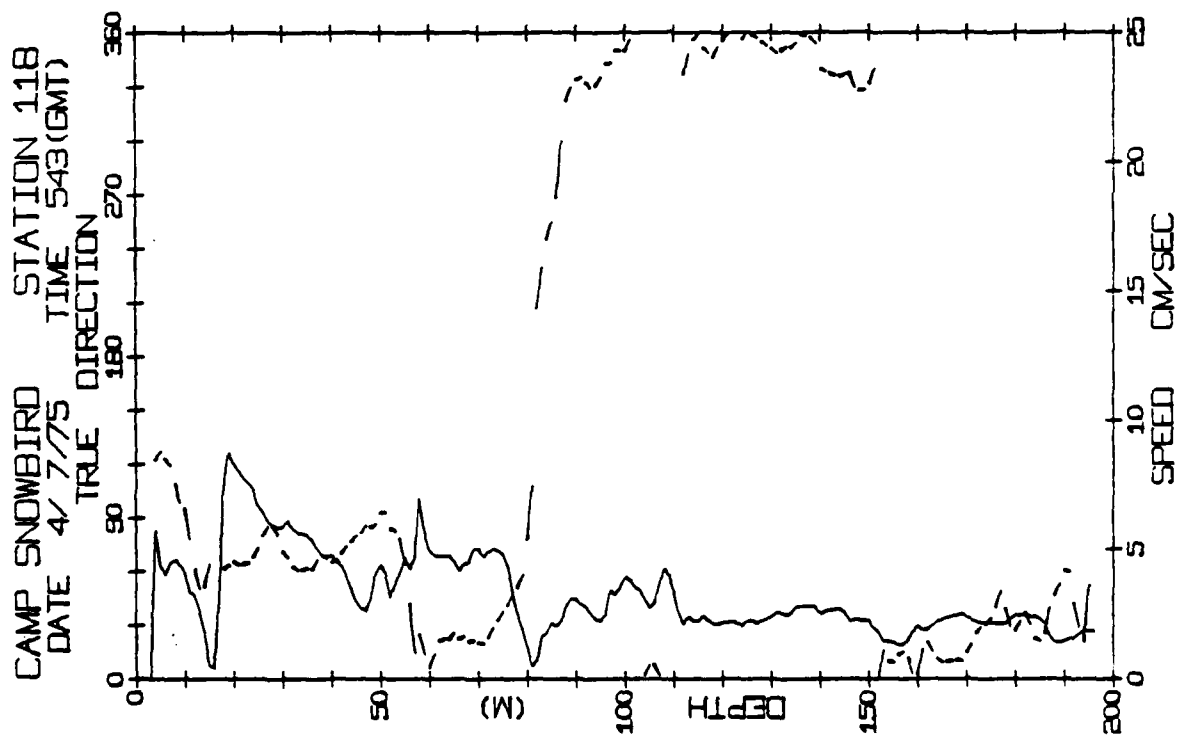
CAMP SNOWBIRD STATION 115
 DATE 2/7/75 TIME 2103(GMT)
 TRUE DIRECTION



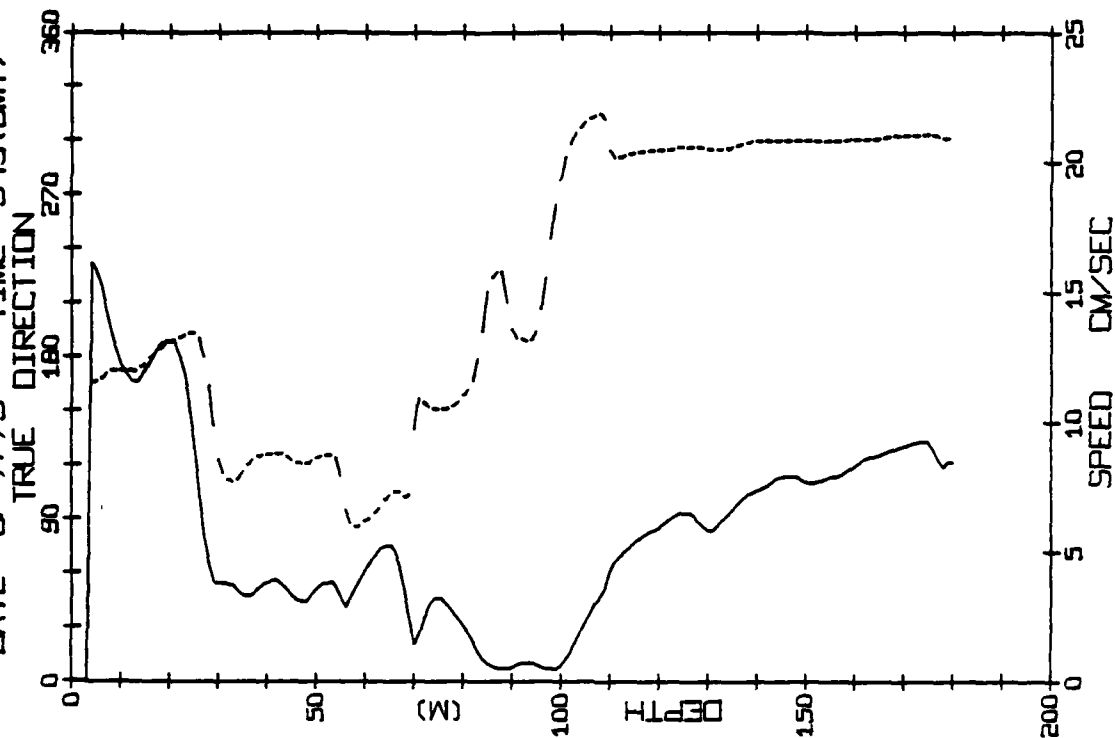
CAMP SNOWBIRD STATION 114
 DATE 2/7/75 TIME 543(GMT)
 TRUE DIRECTION



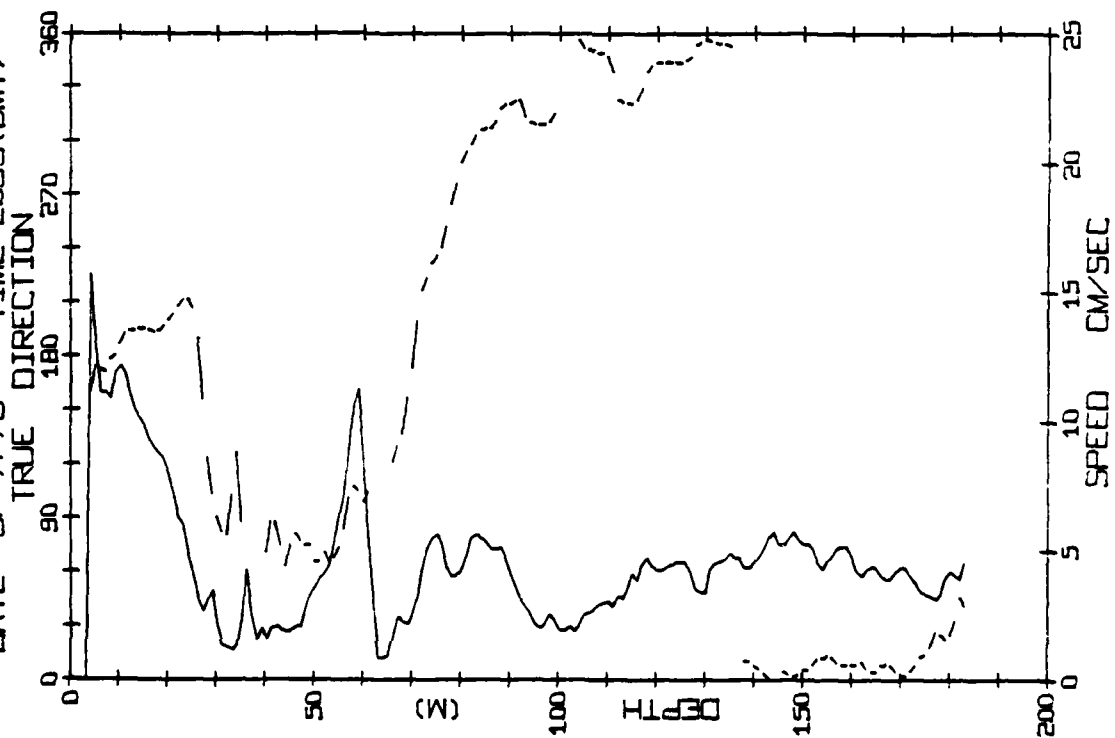




CAMP SNOWBIRD STATION 121
DATE 6/7/75 TIME 543(GMT)

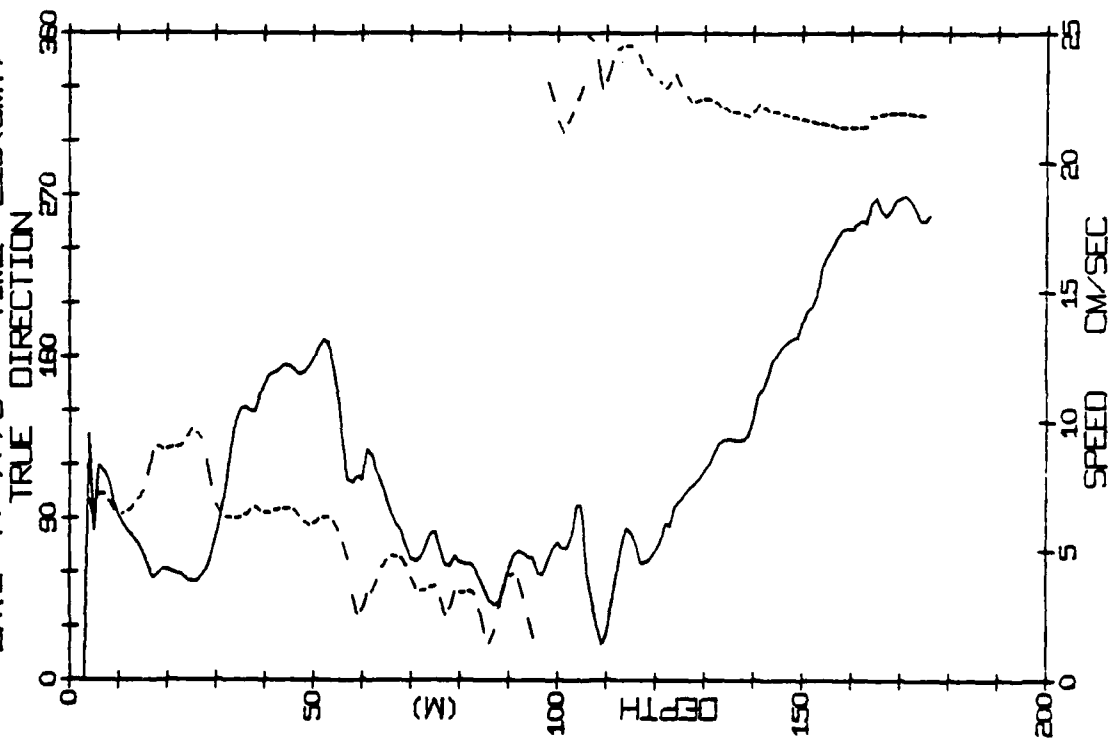


CAMP SNOWBIRD STATION 120
DATE 5/7/75 TIME 2053(GMT)



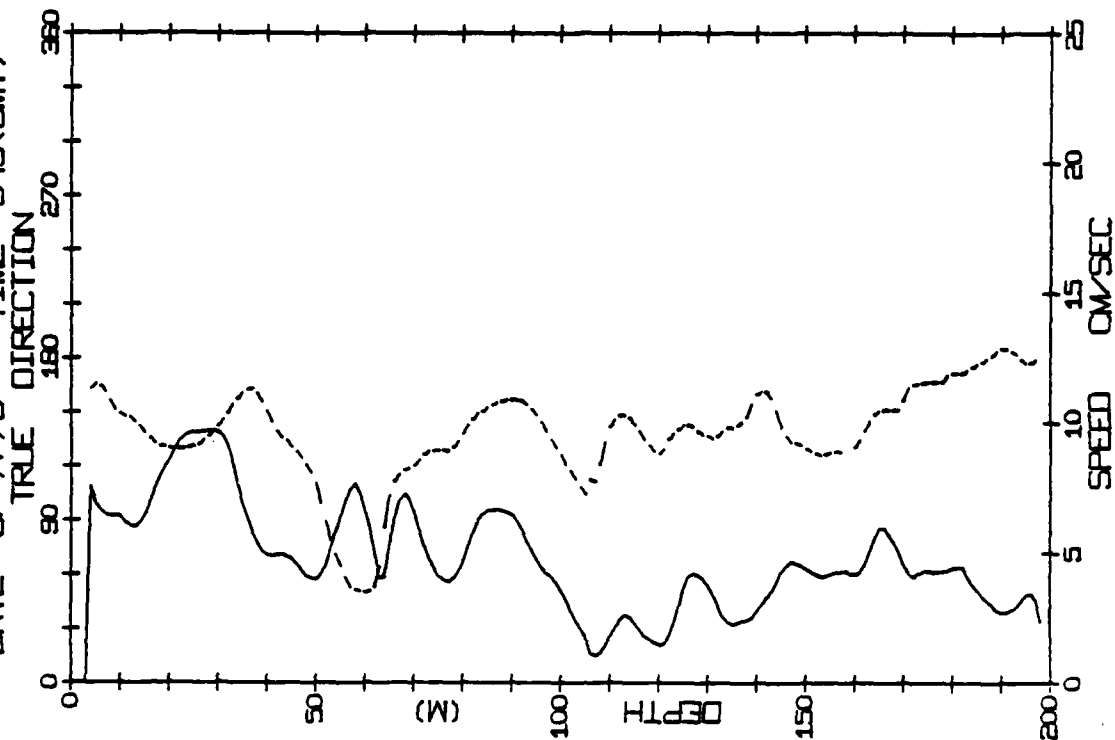
CAMP SNOWBIRD
DATE 7/7/75

STATION 122
TIME 215 (GMT)



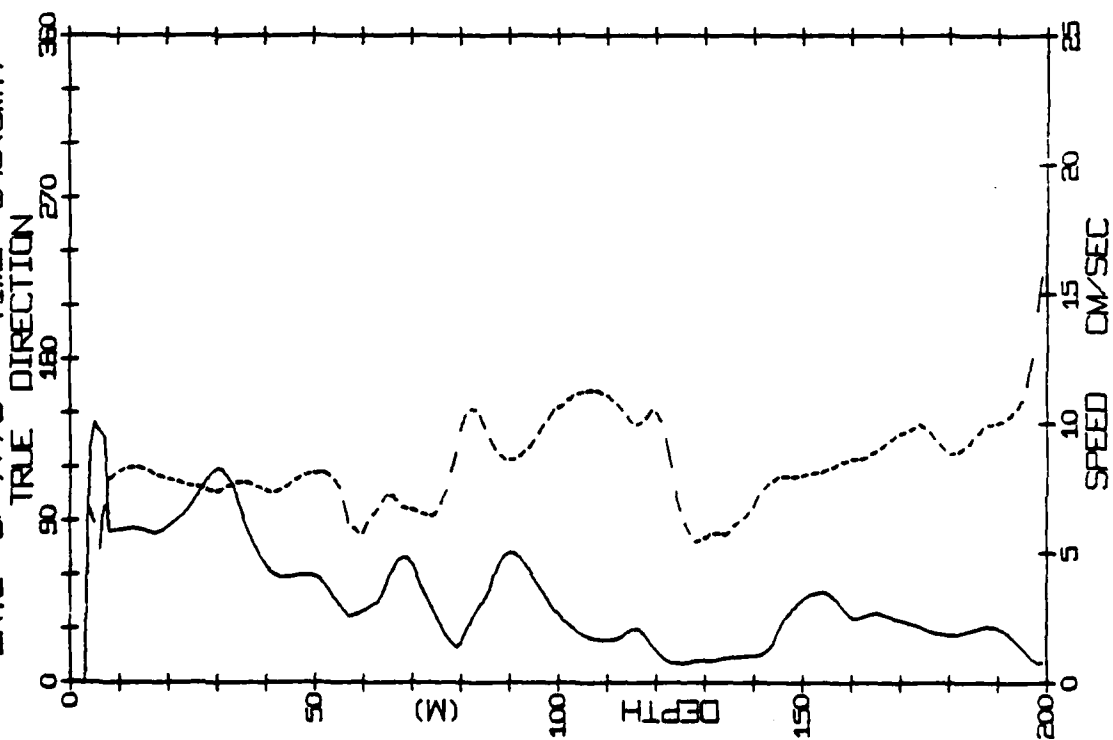
CAMP SNOWBIRD
DATE 8/7/75

STATION 123
TIME 543 (GMT)



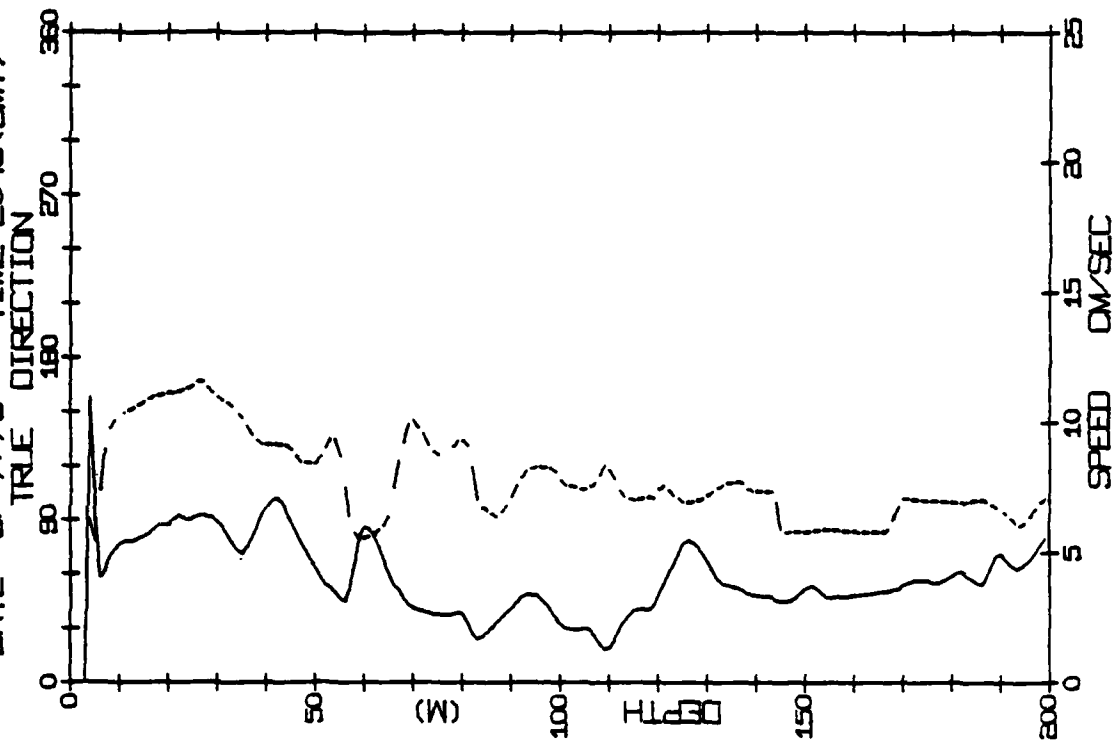
CAMP SNOWBIRD
DATE 9/7/75

STATION 125
TIME 543(GMT)

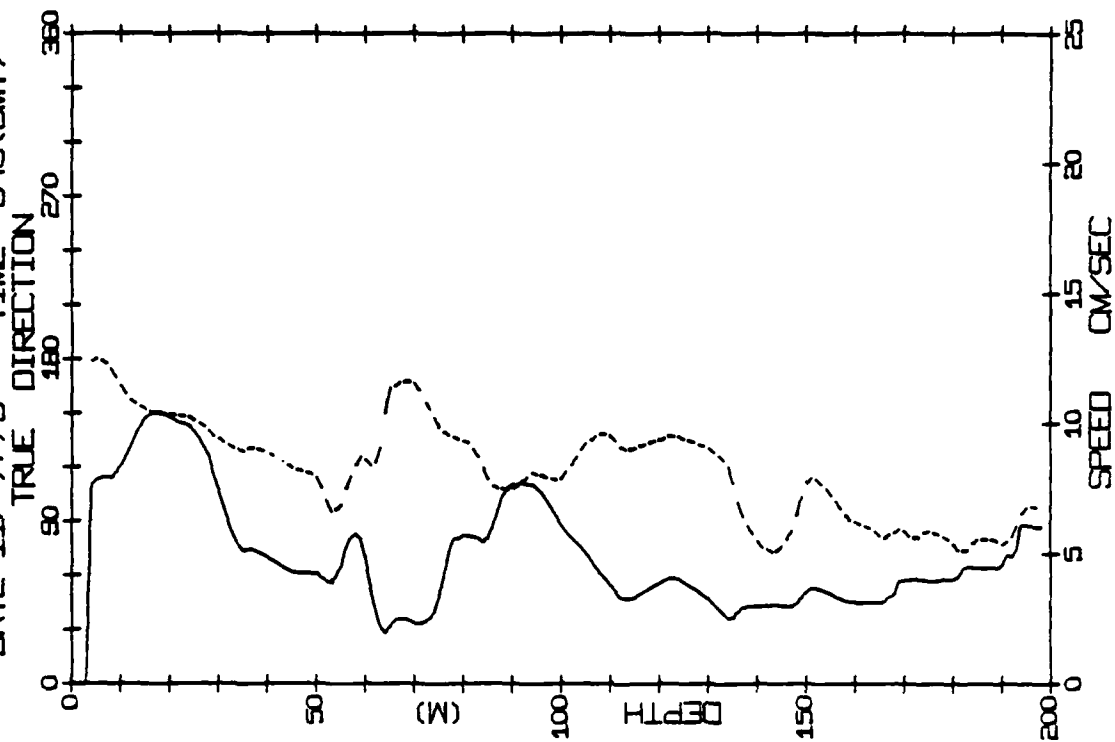


CAMP SNOWBIRD
DATE 9/7/75

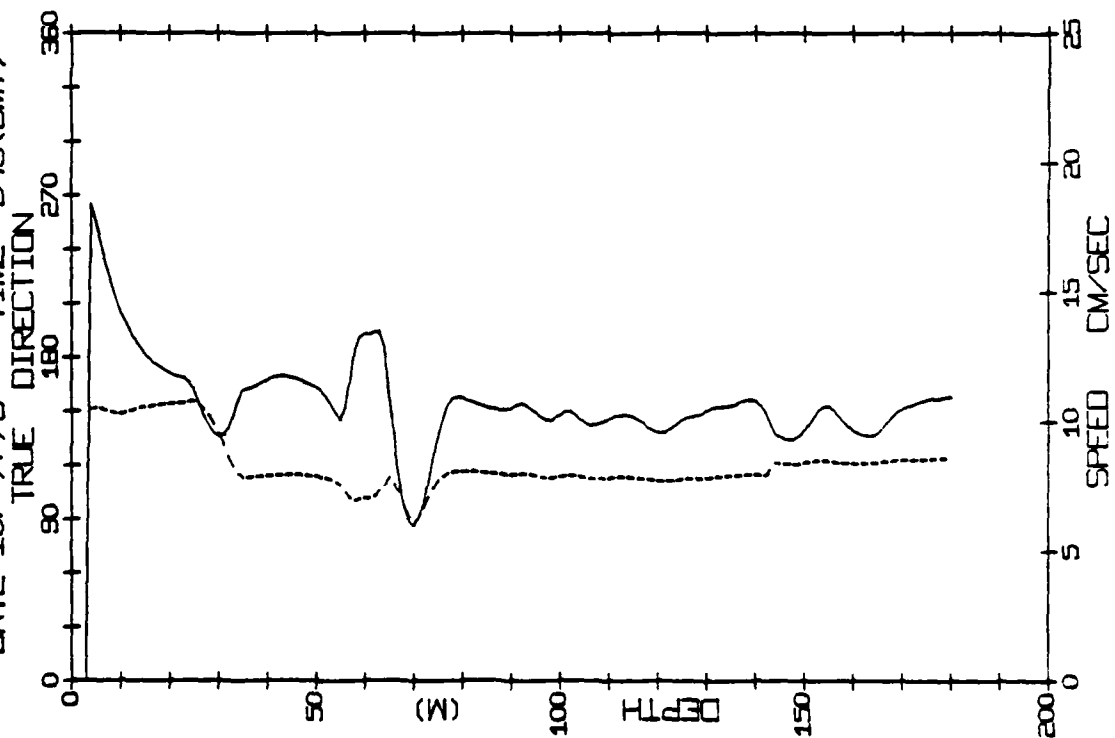
STATION 126
TIME 2043(GMT)

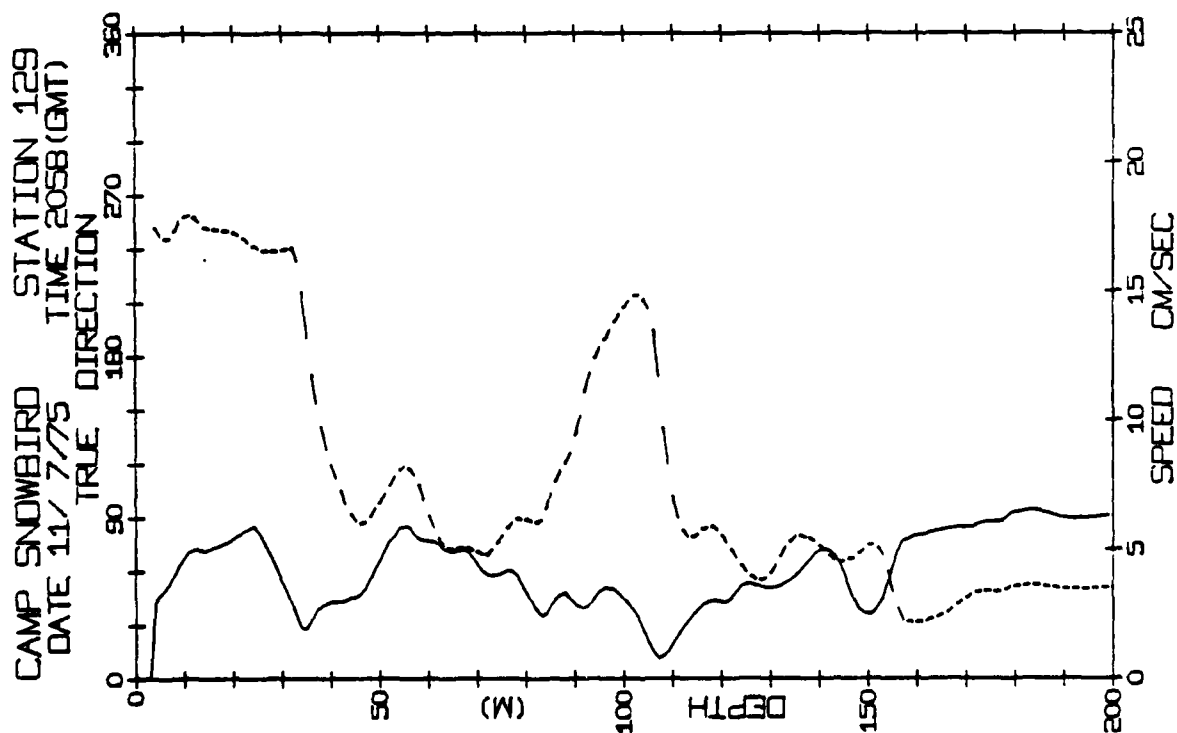
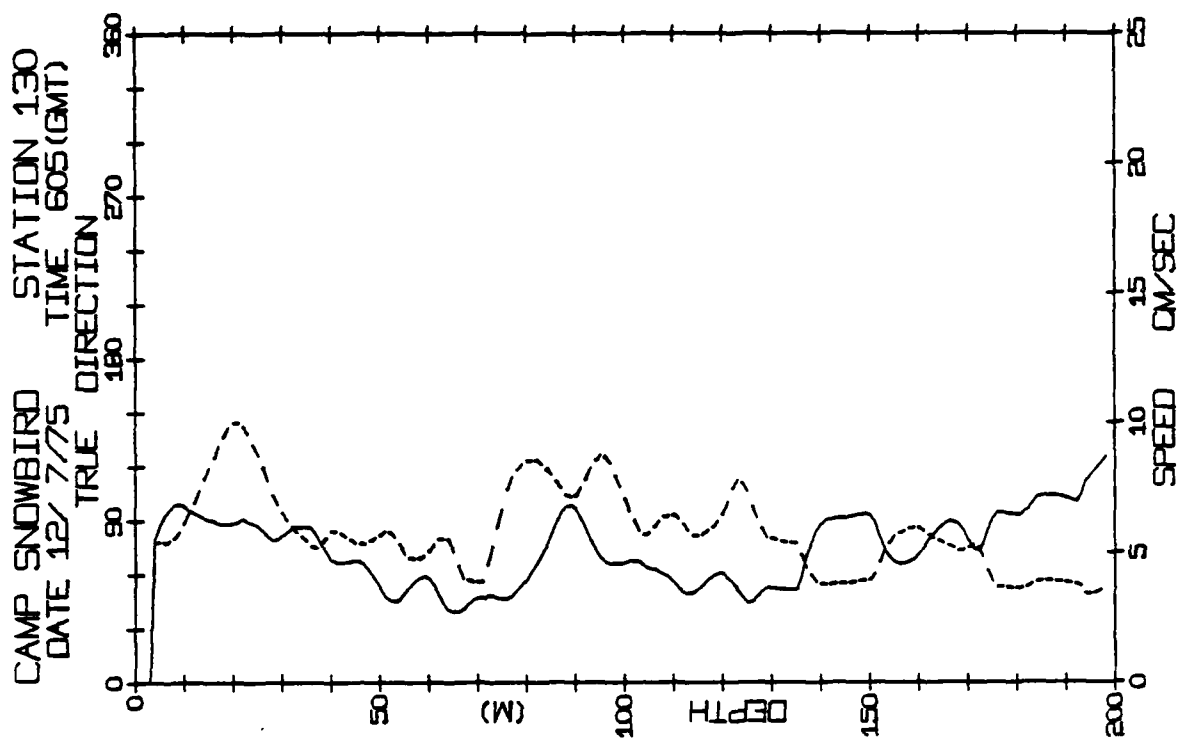


CAMP SNOWBIRD STATION 128
DATE 11/ 7/75 TIME 543(GMT)

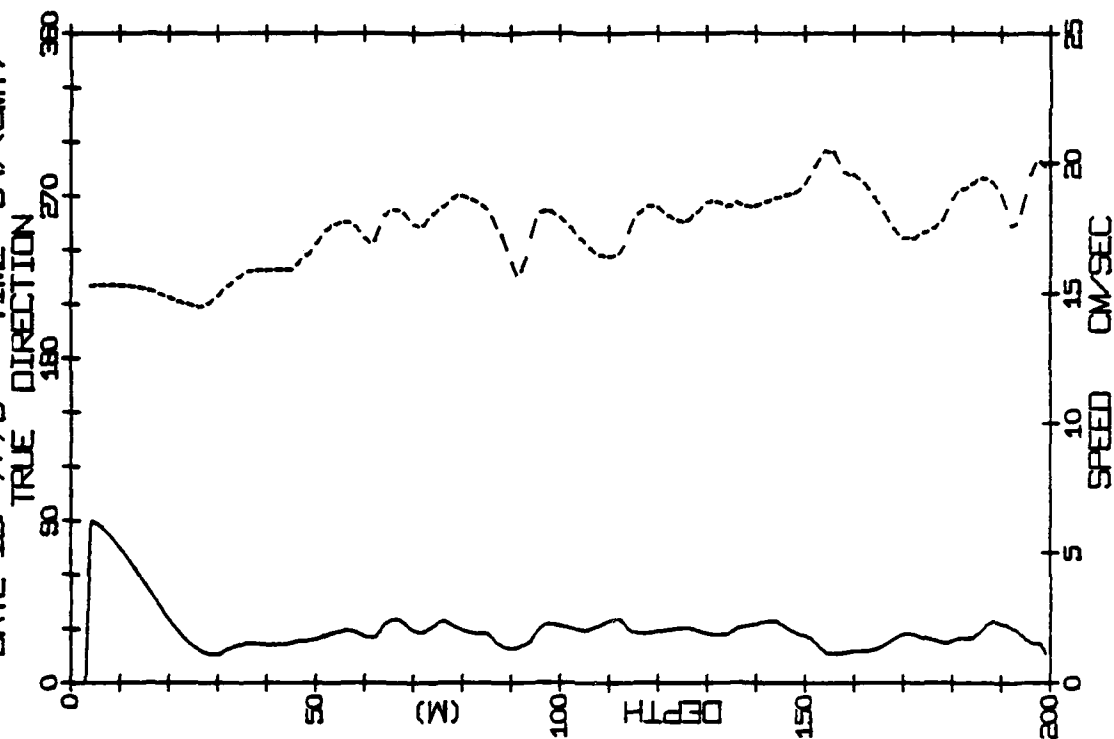


CAMP SNOWBIRD STATION 127
DATE 10/ 7/75 TIME 543(GMT)

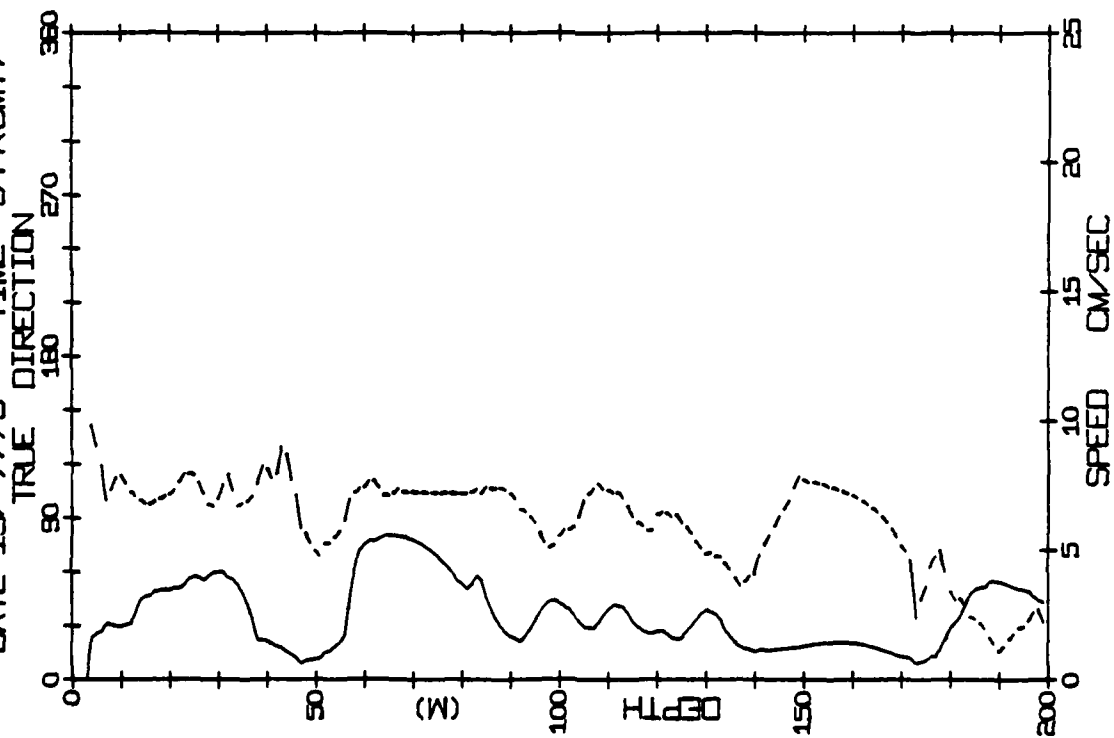




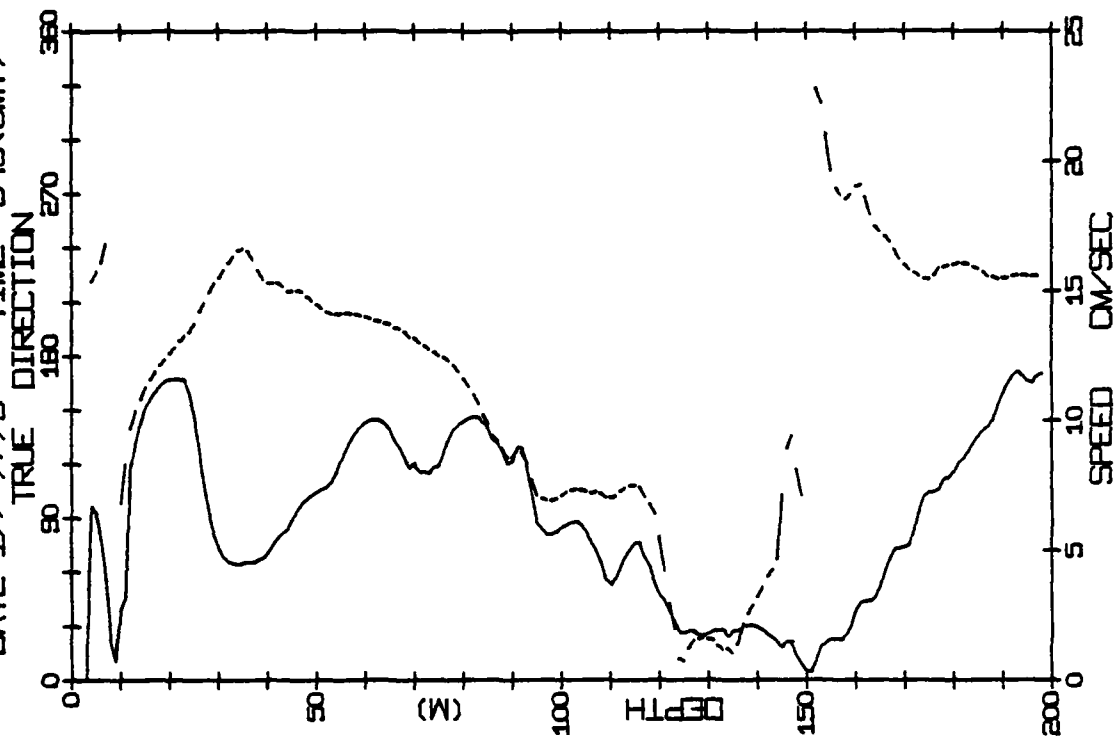
CAMP SNOWBIRD STATION 133
 DATE 15/ 7/75 TIME 547 (GMT)



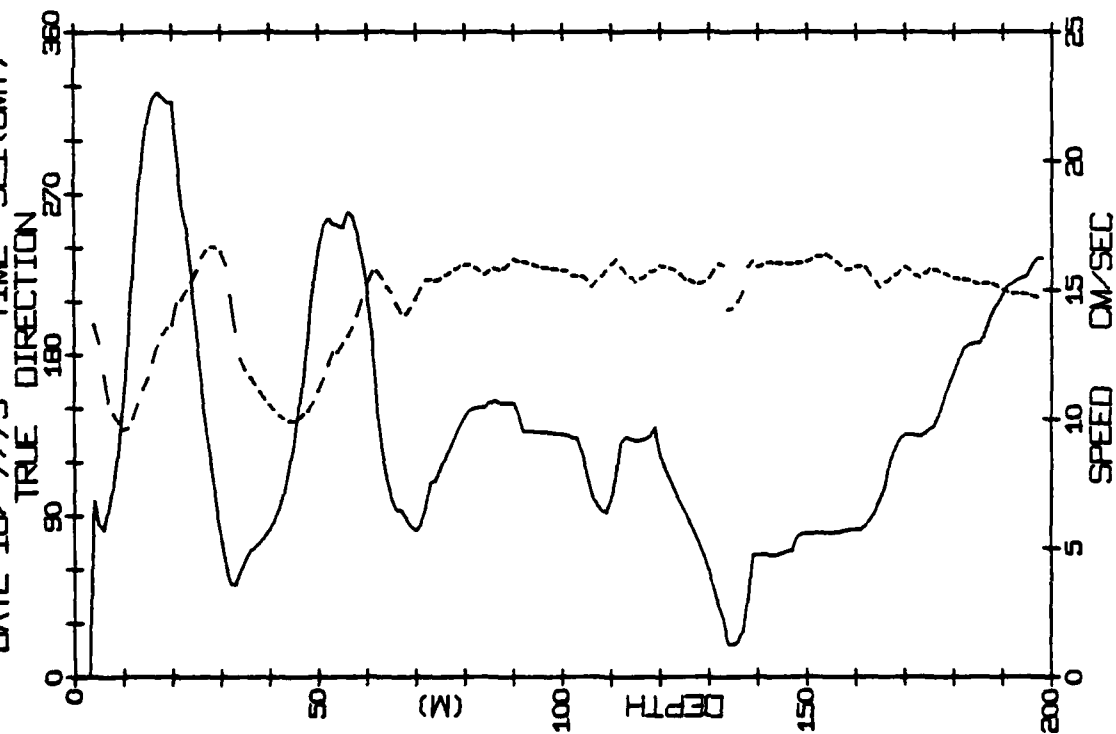
CAMP SNOWBIRD STATION 131
 DATE 13/ 7/75 TIME 544 (GMT)



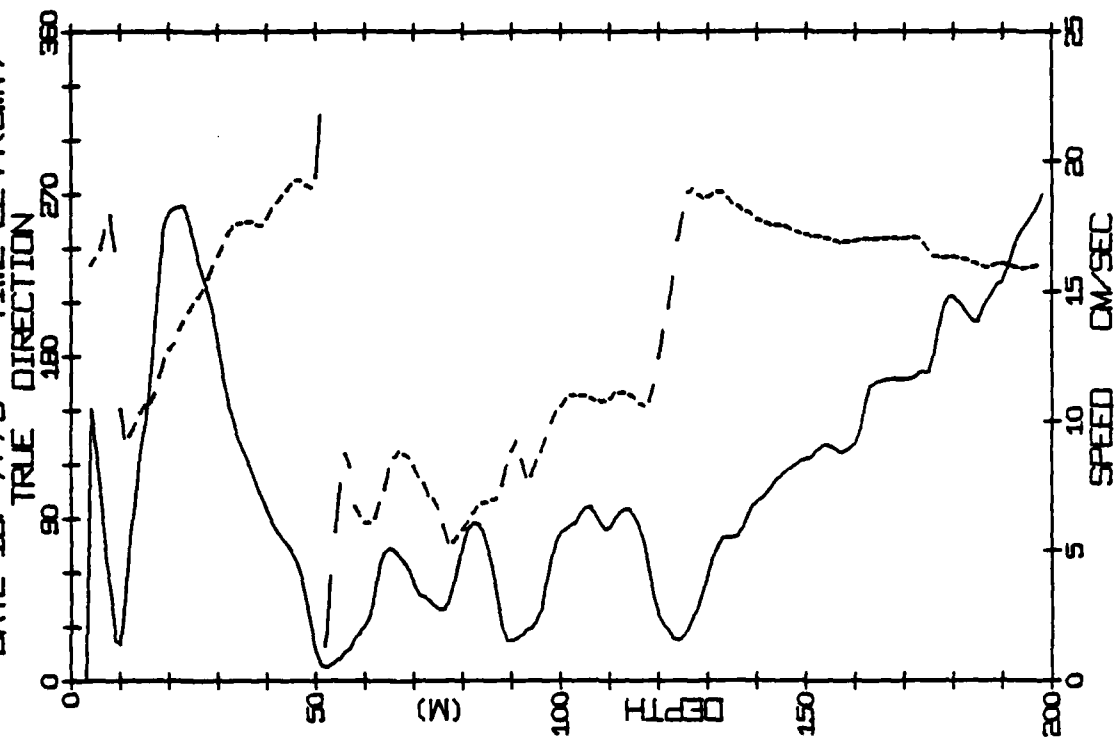
CAMP SNOWBIRD STATION 137
DATE 17/ 7/75 TIME 543(GMT)



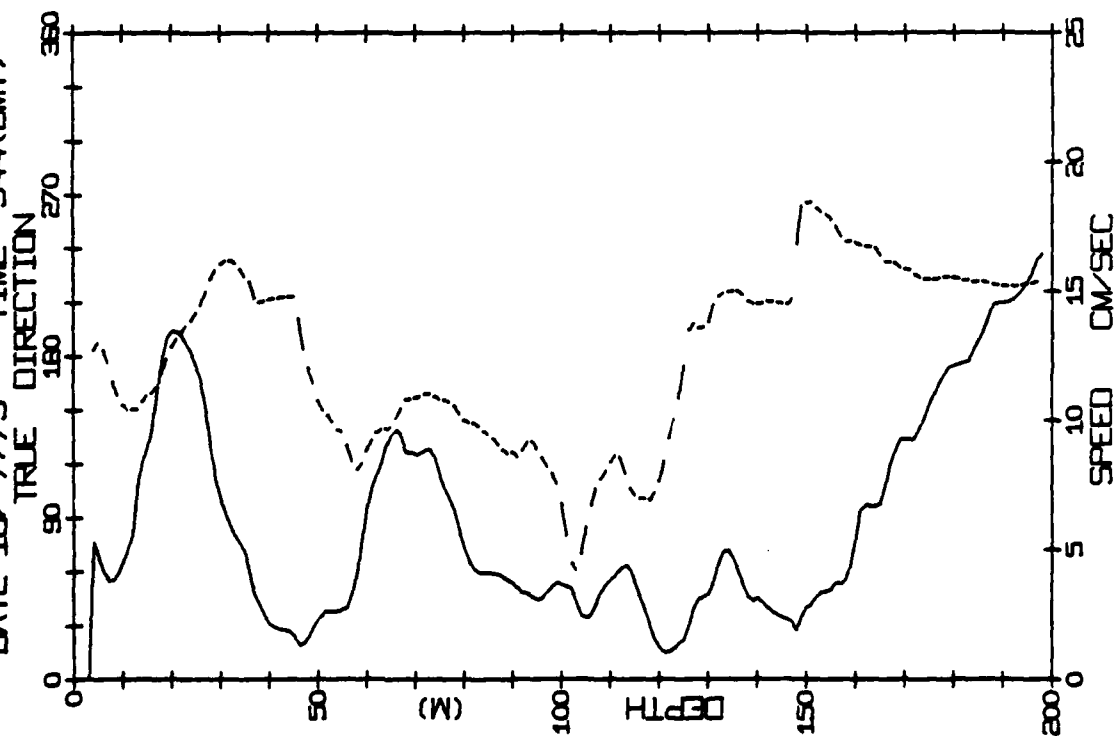
CAMP SNOWBIRD STATION 135
DATE 16/ 7/75 TIME 521(GMT)



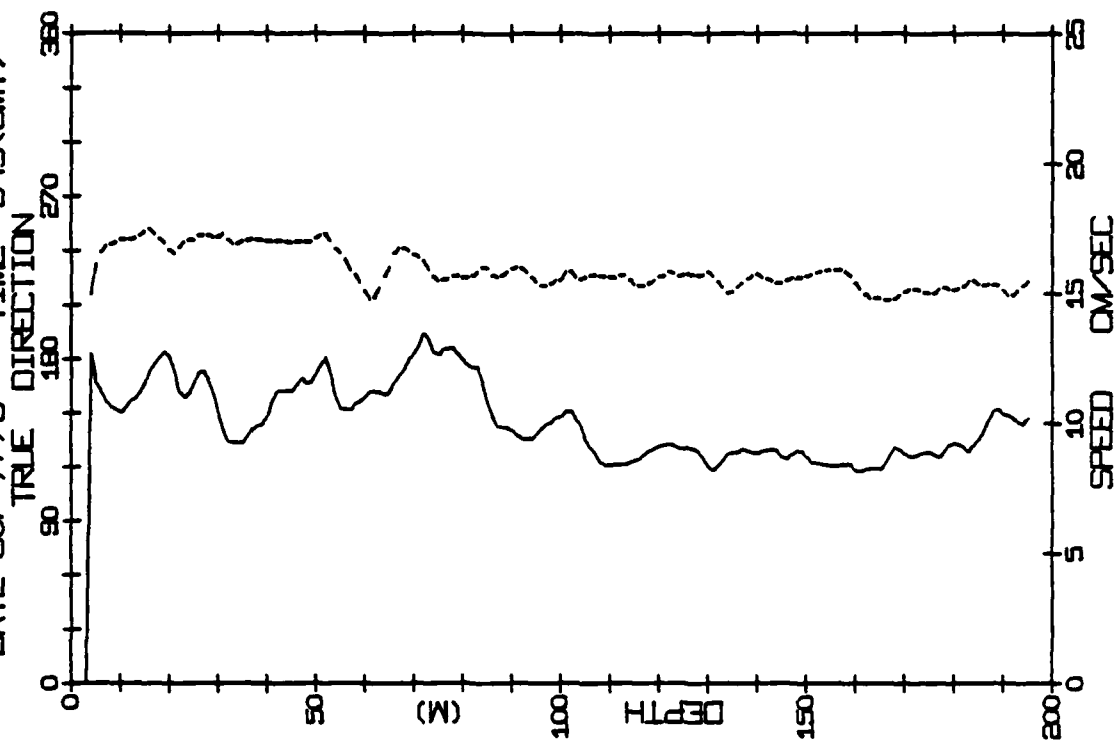
CAMP SNOWBIRD STATION 140
DATE 18/ 7/75 TIME 2244(GMT)



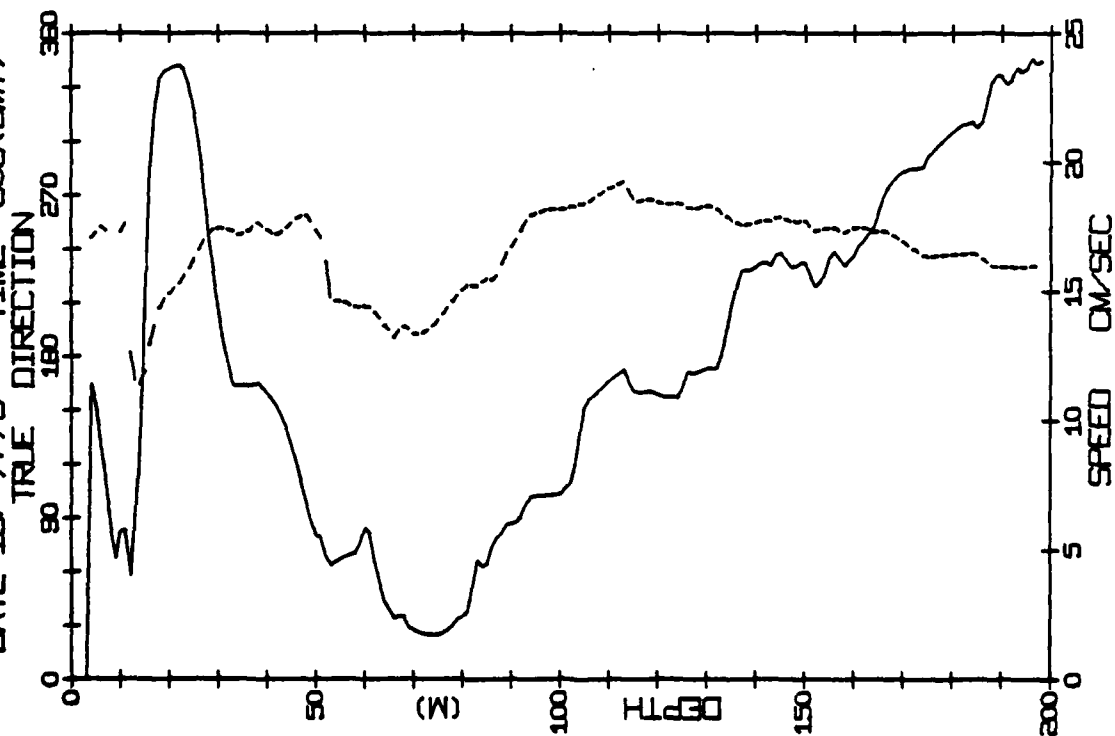
CAMP SNOWBIRD STATION 139
DATE 18/ 7/75 TIME 544(GMT)



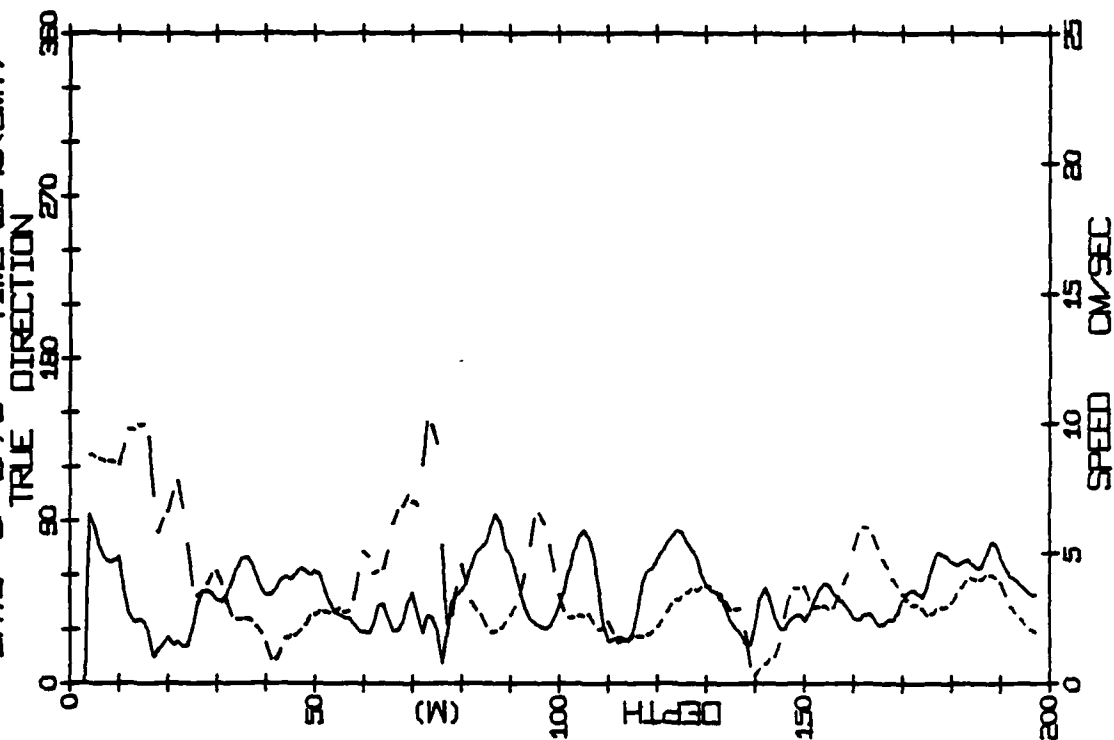
CAMP SNOWBIRD STATION 146
DATE 30/ 7/75 TIME 543(GMT)



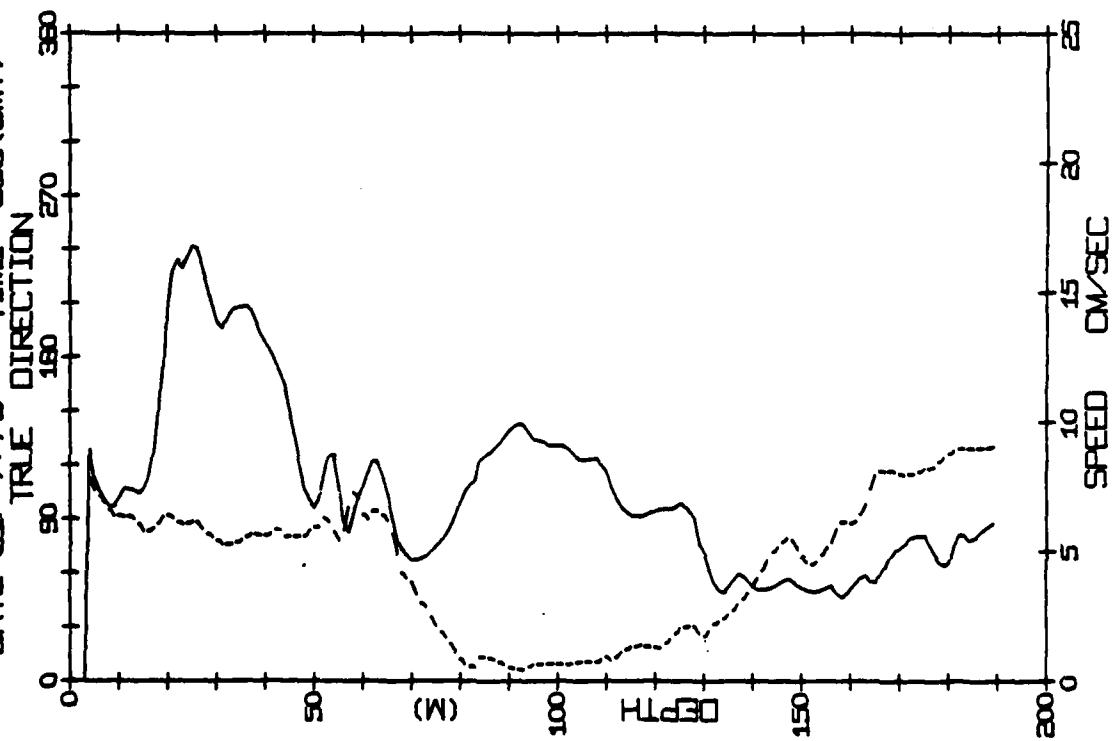
CAMP SNOWBIRD STATION 141
DATE 19/ 7/75 TIME 606(GMT)



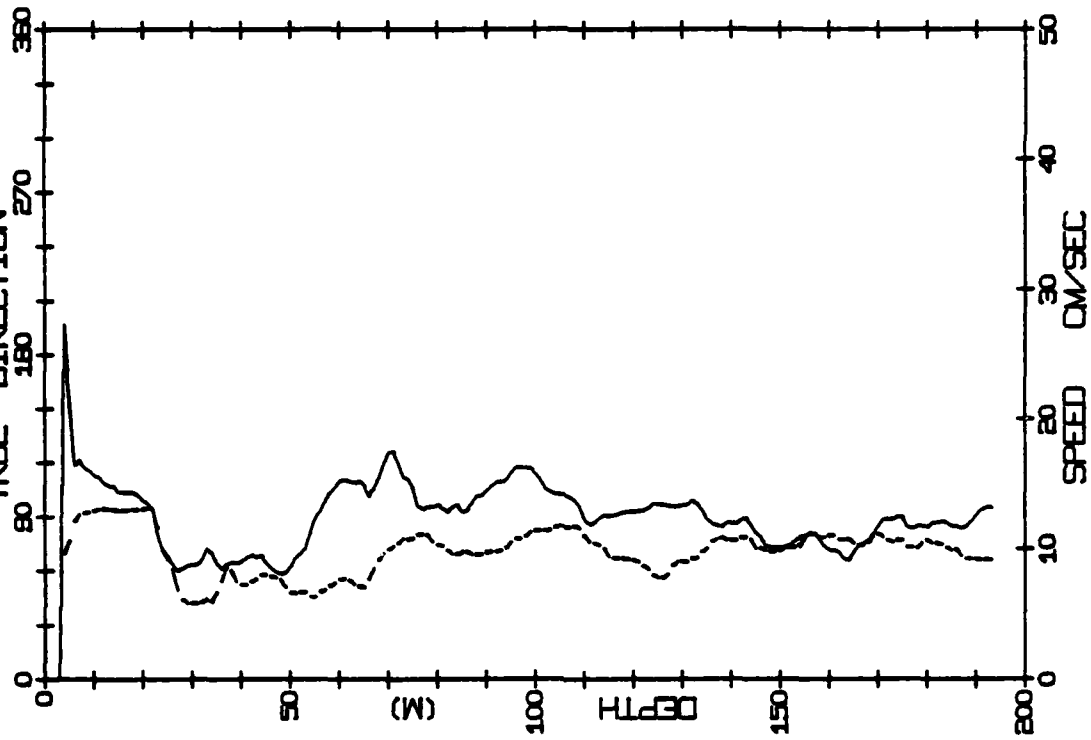
CAMP SNOWBIRD STATION 152
DATE 3/ 8/75 TIME 2243(GMT)



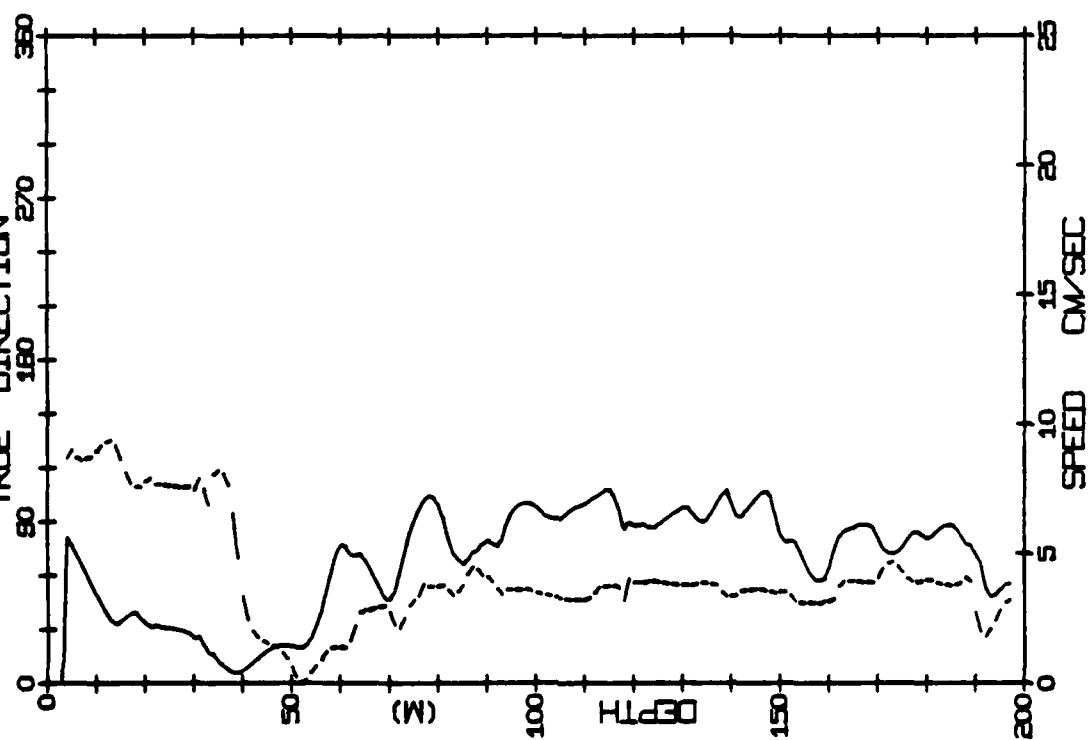
CAMP SNOWBIRD STATION 147
DATE 31/ 7/75 TIME 656(GMT)



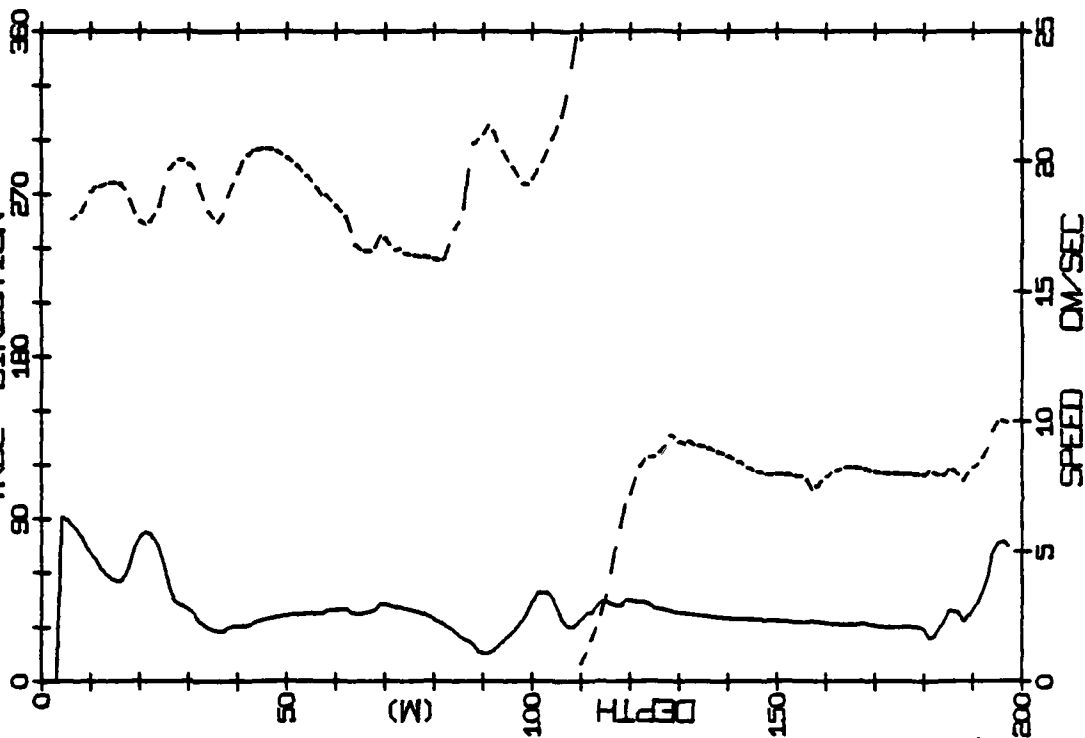
CAMP SNOWBIRD STATION 154
 DATE 4/8/75 TIME 2244(GMT)
 TRUE DIRECTION



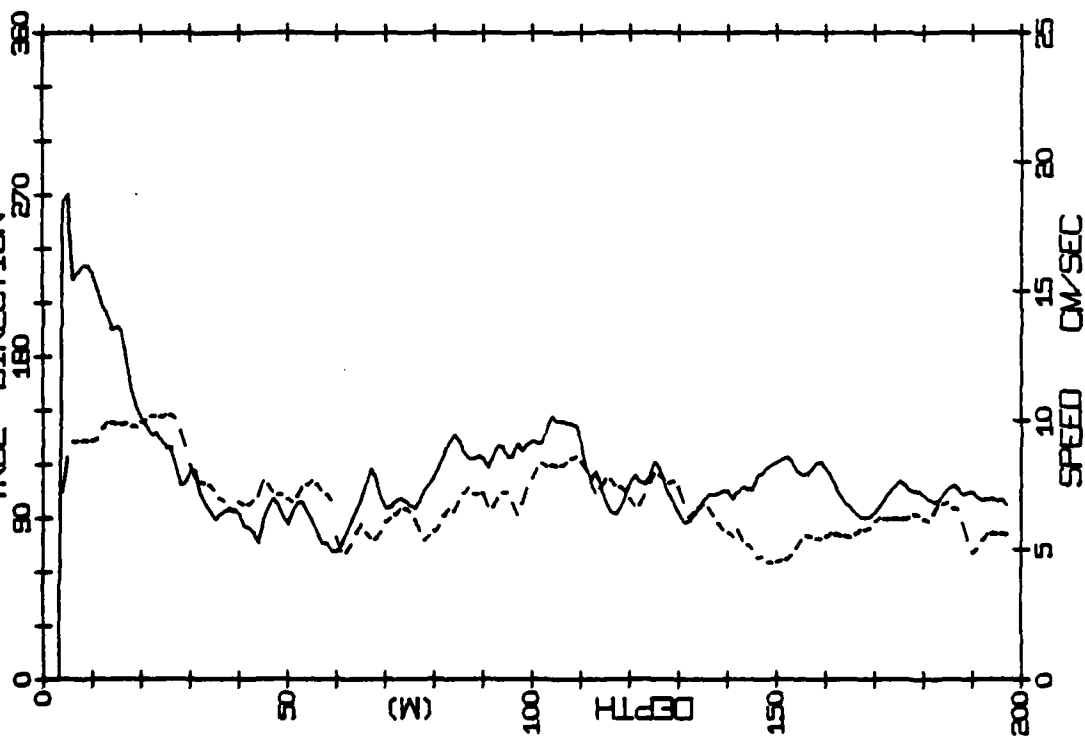
CAMP SNOWBIRD STATION 153
 DATE 4/8/75 TIME 520(GMT)
 TRUE DIRECTION



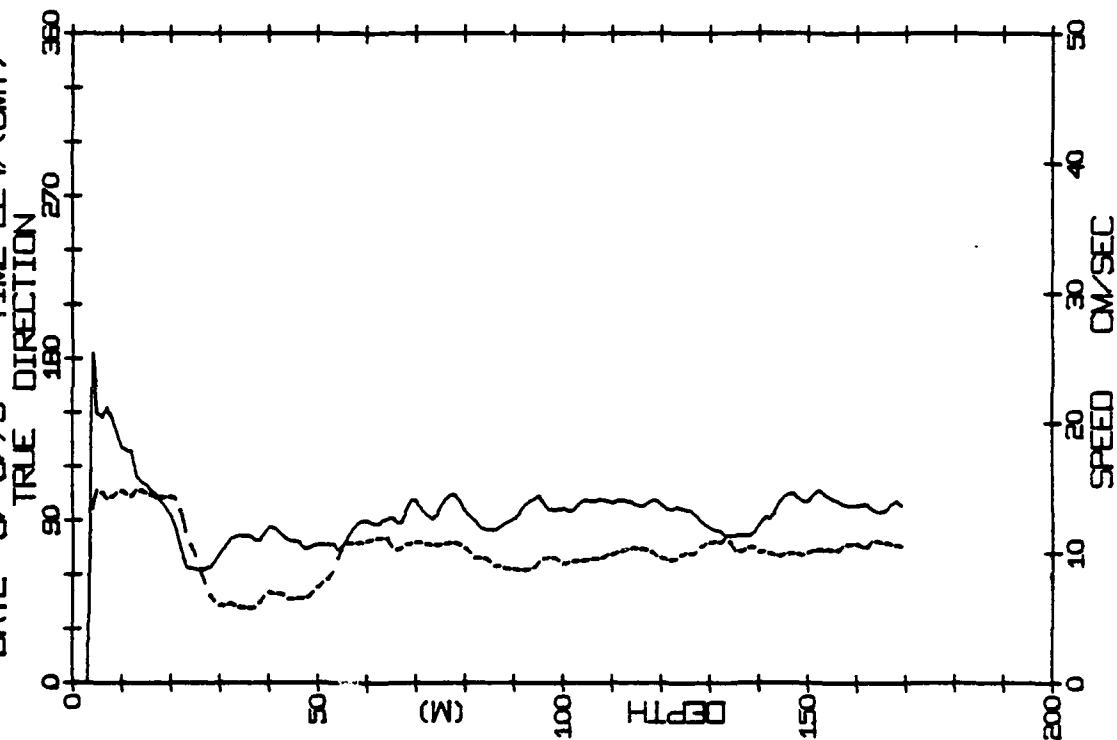
CAMP SNOWBIRD STATION 159
 DATE 6/8/75 TIME 2243(GMT)
 TRUE DIRECTION



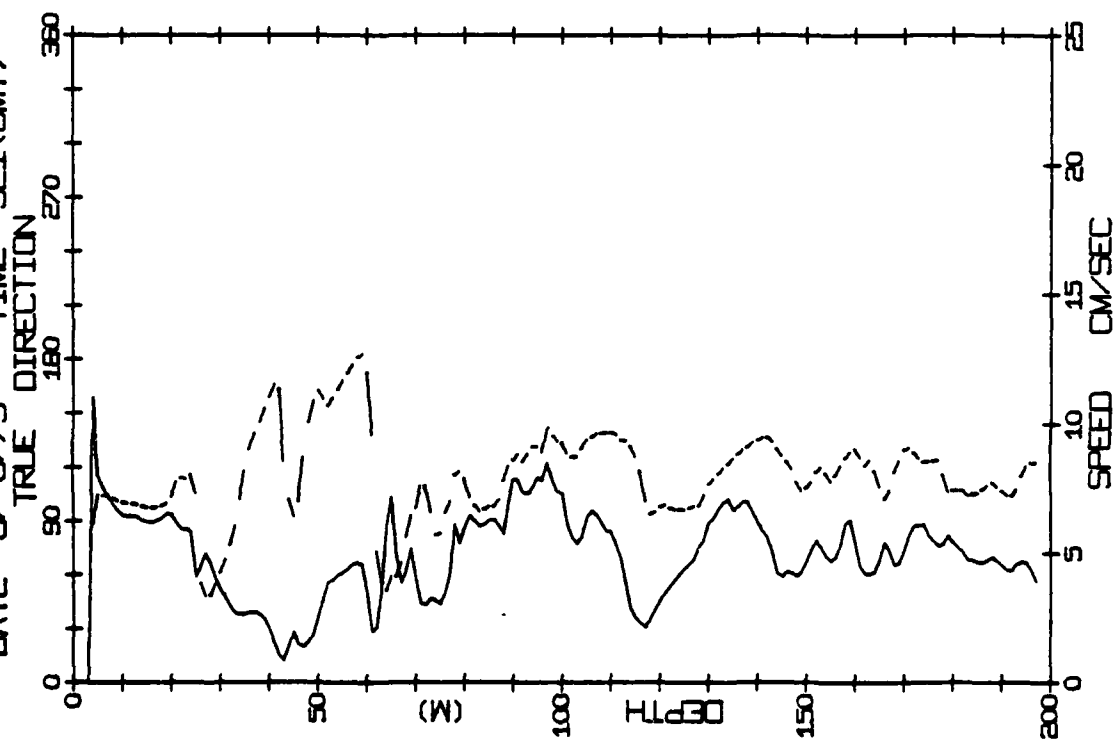
CAMP SNOWBIRD STATION 155
 DATE 5/8/75 TIME 543(GMT)
 TRUE DIRECTION



CAMP SNOWBIRD STATION 163
DATE 8/ 8/75 TIME 2247 (GMT)



CAMP SNOWBIRD STATION 162
DATE 8/ 8/75 TIME 521 (GMT)



AD-A109 990

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY PALISADES NY

F/G 8/3

ARCTIC ICE DYNAMICS JOINT EXPERIMENT 1975-1976 PHYSICAL OCEANOGRAPHY--ETC(U)

FEB 80 T O MANLEY, K HUNKINS, W TIEMANN

N00014-76-C-0004

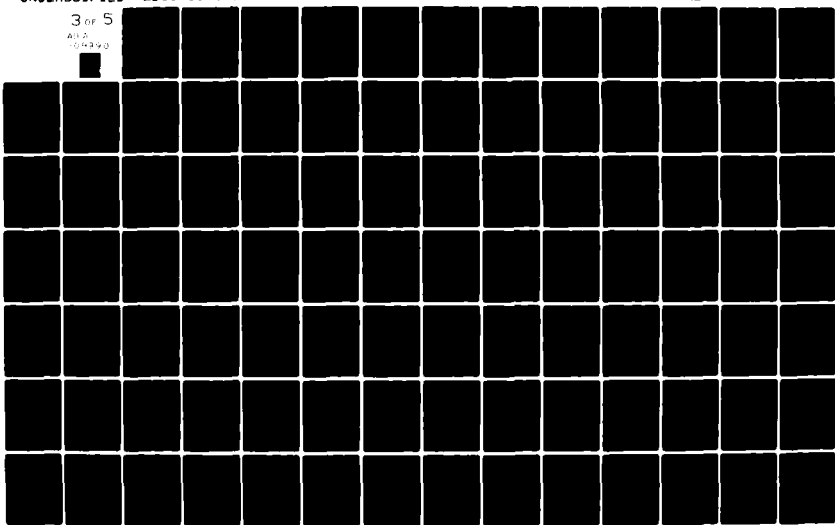
UNCLASSIFIED

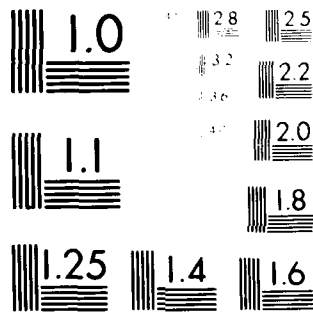
LD60-CU-6-80

NL

3 of 5

ALL INFORMATION CONTAINED
HEREIN IS UNCLASSIFIED

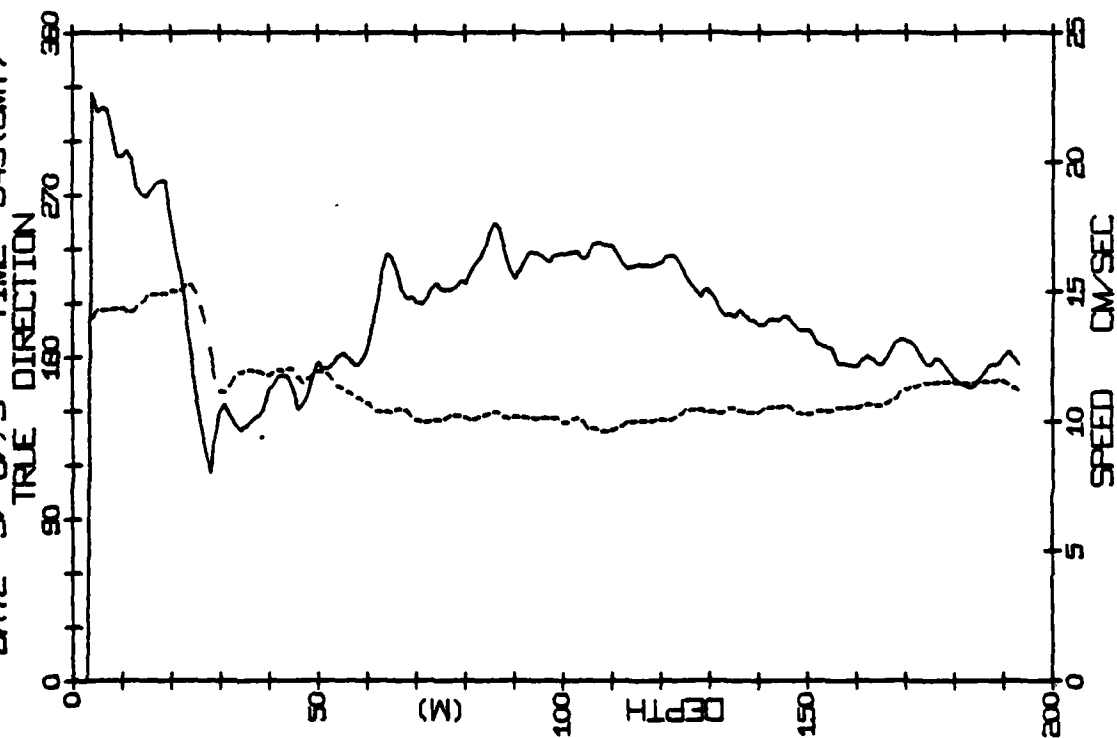




MICROCOPY RESOLUTION TEST CHART
 NATIONAL BUREAU OF STANDARDS-1963-A

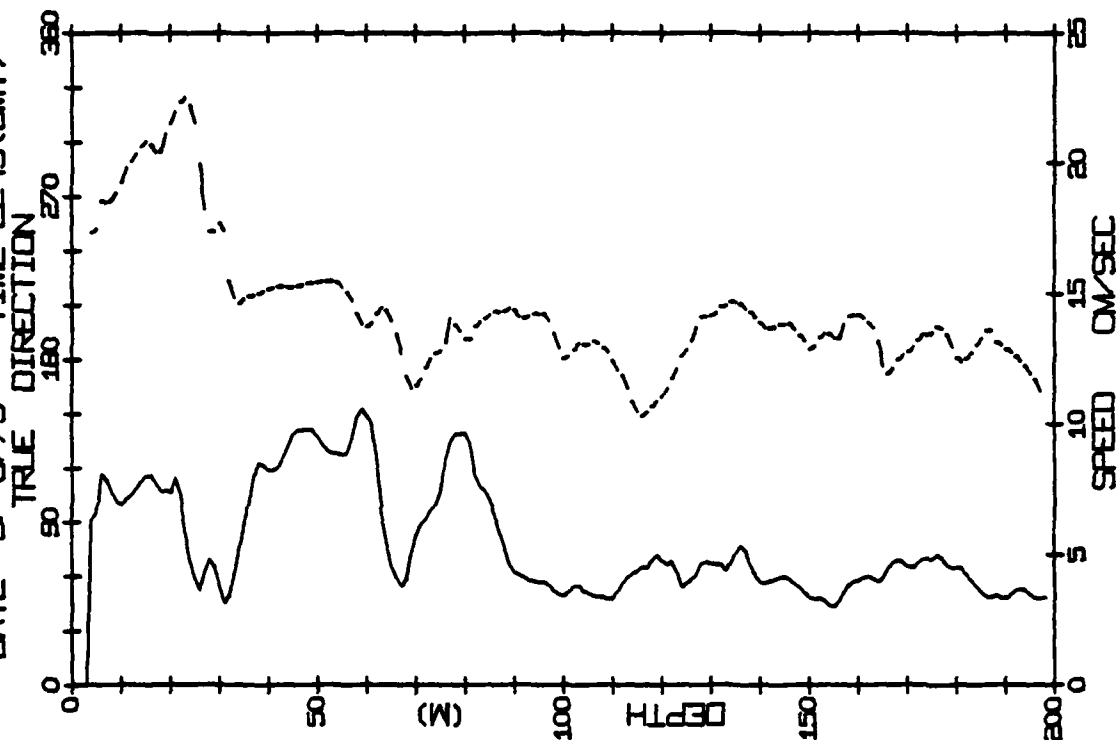
CAMP SNOWBIRD
DATE 9/ 8/75

STATION 165
TIME 543(GMT)

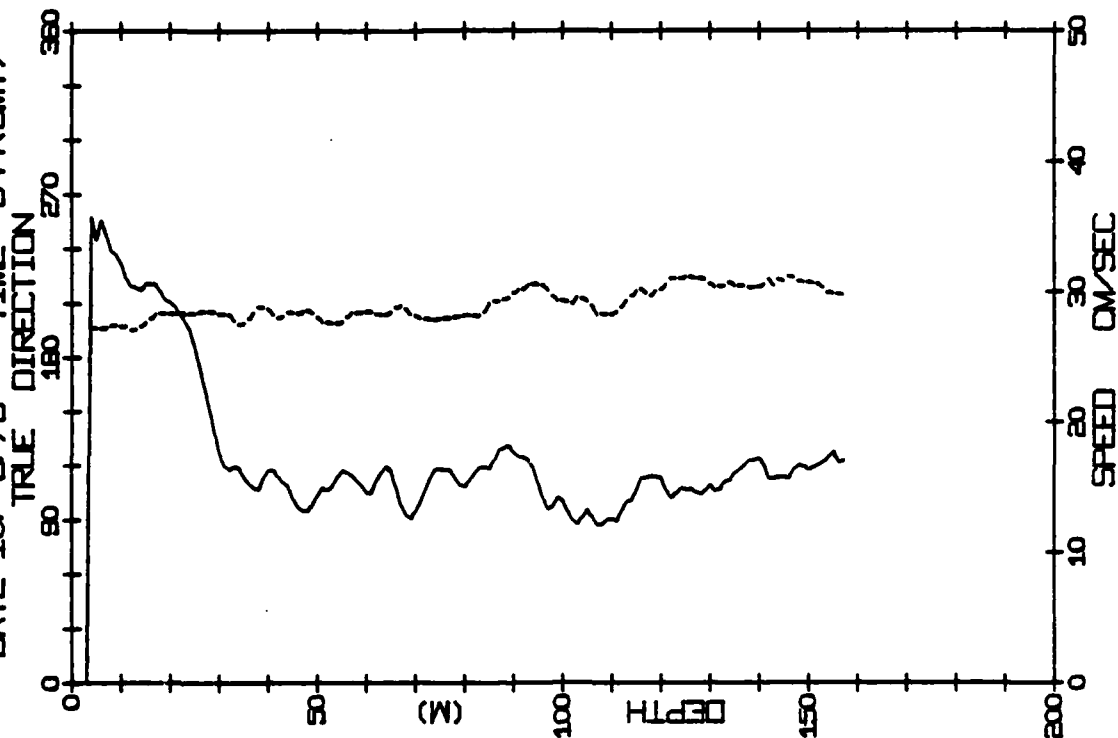


CAMP SNOWBIRD
DATE 9/ 8/75

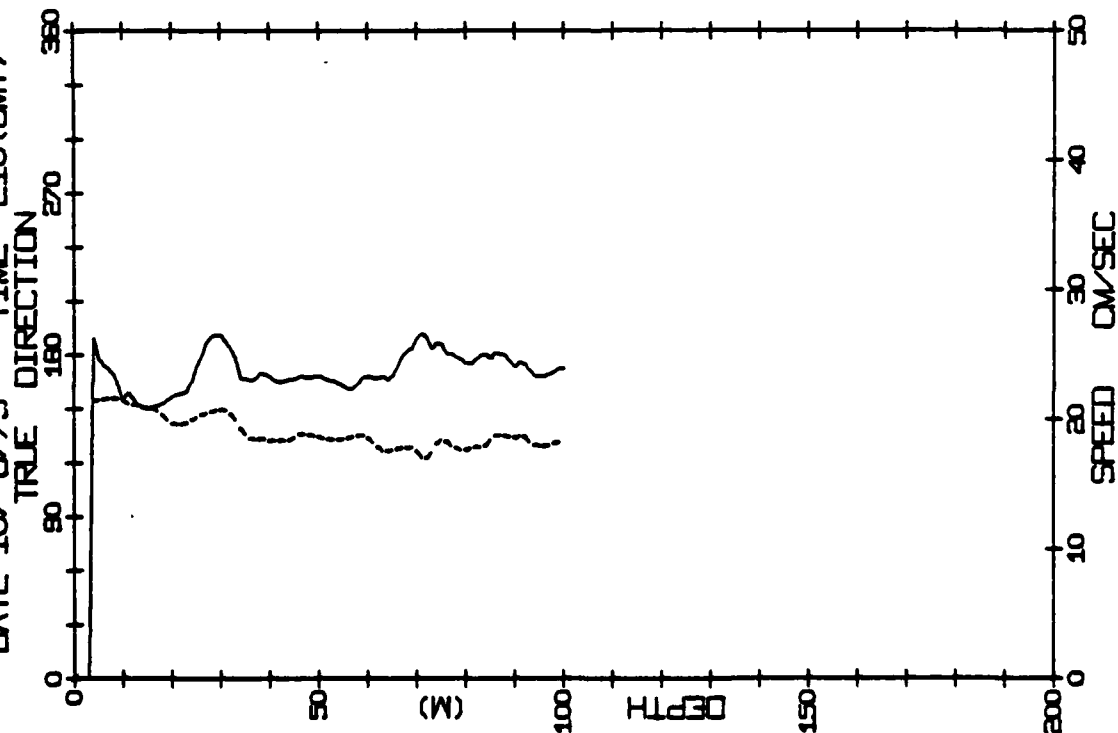
STATION 168
TIME 2243(GMT)



CAMP SNOWBIRD STATION 170
DATE 10/ 8/75 TIME 544(GMT)



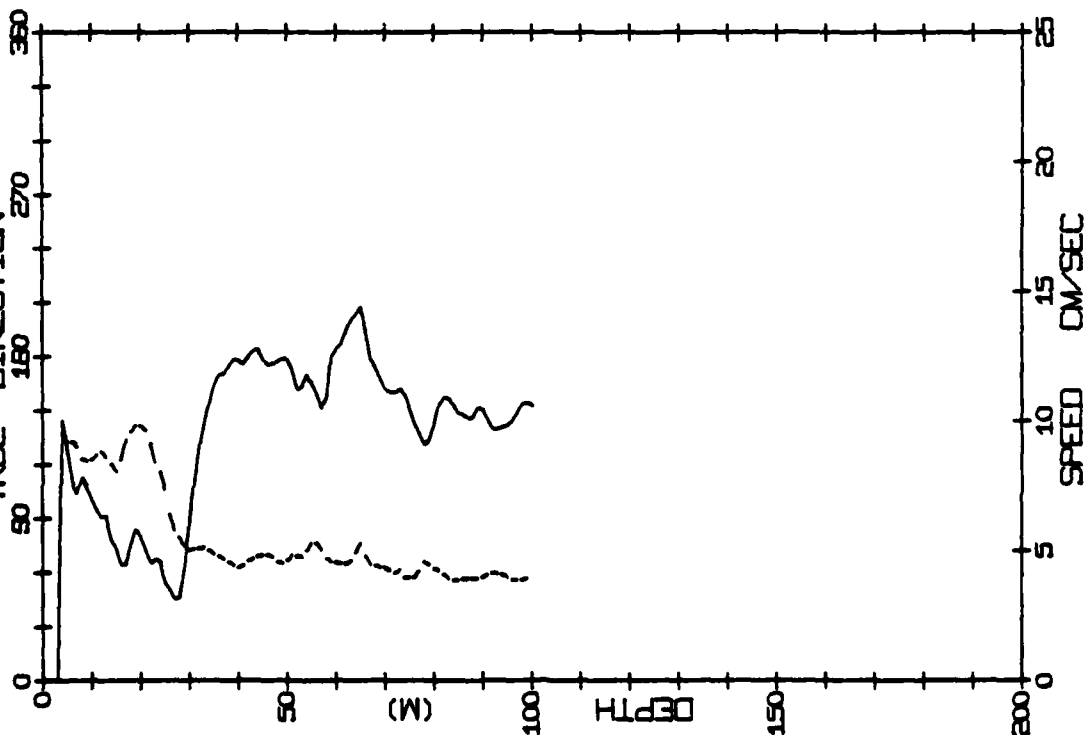
CAMP SNOWBIRD STATION 169
DATE 10/ 8/75 TIME 210(GMT)



CAMP SNOWBIRD
DATE 10/ 8/75

STATION 171
TIME 1411 (GMT)

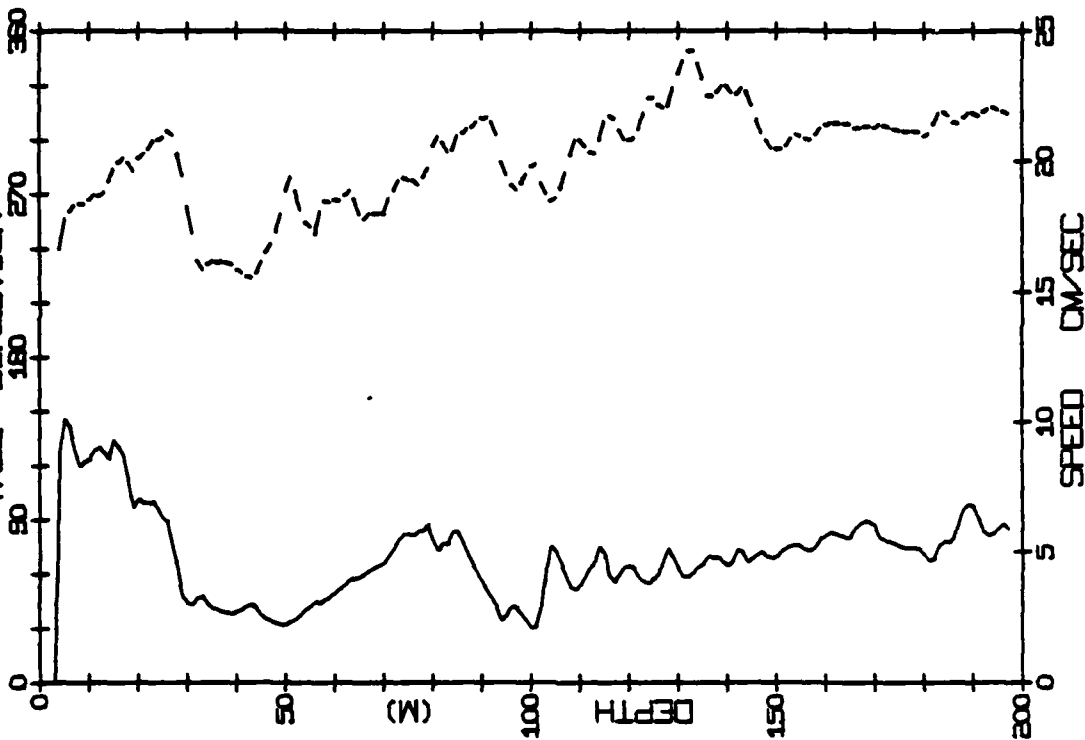
TRUE DIRECTION

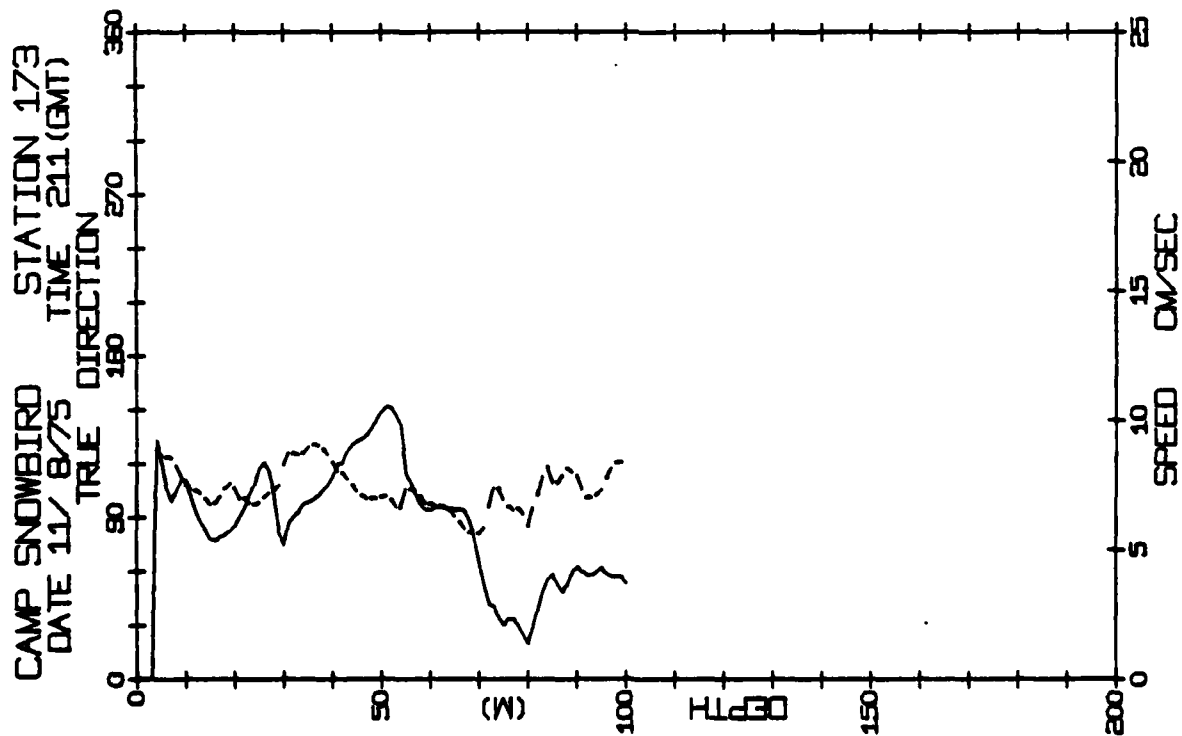


CAMP SNOWBIRD
DATE 10/ 8/75

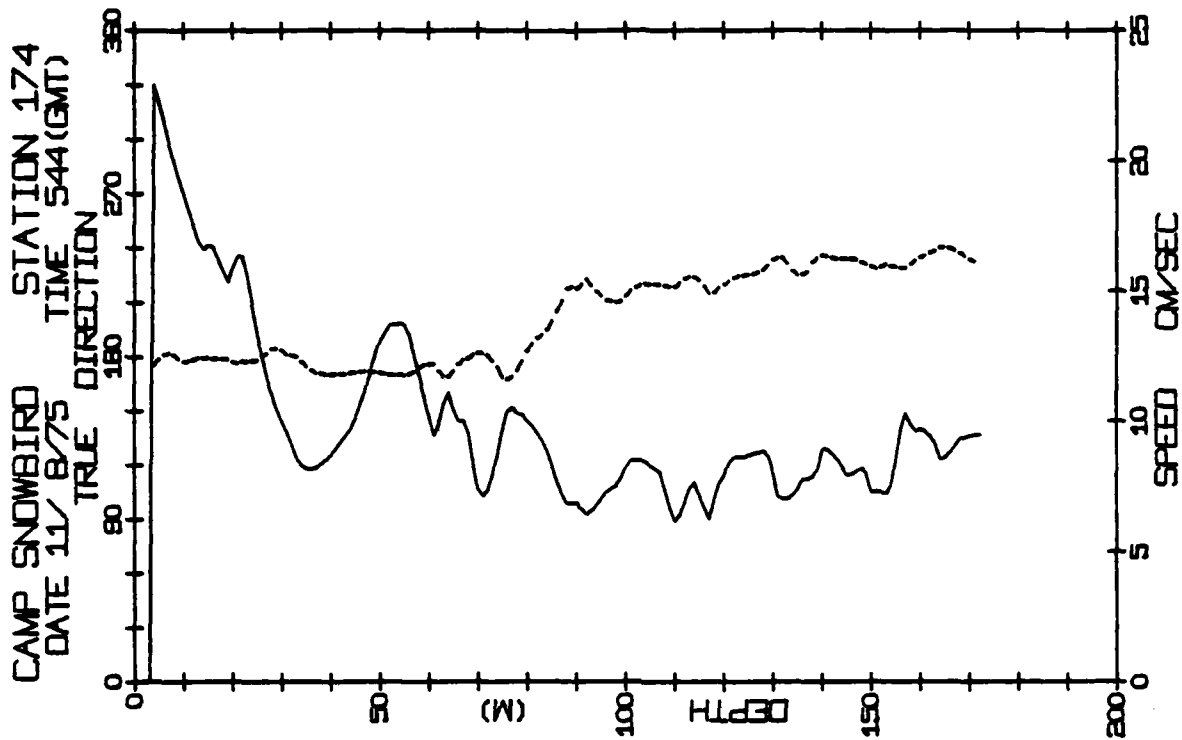
STATION 172
TIME 2244 (GMT)

TRUE DIRECTION





192



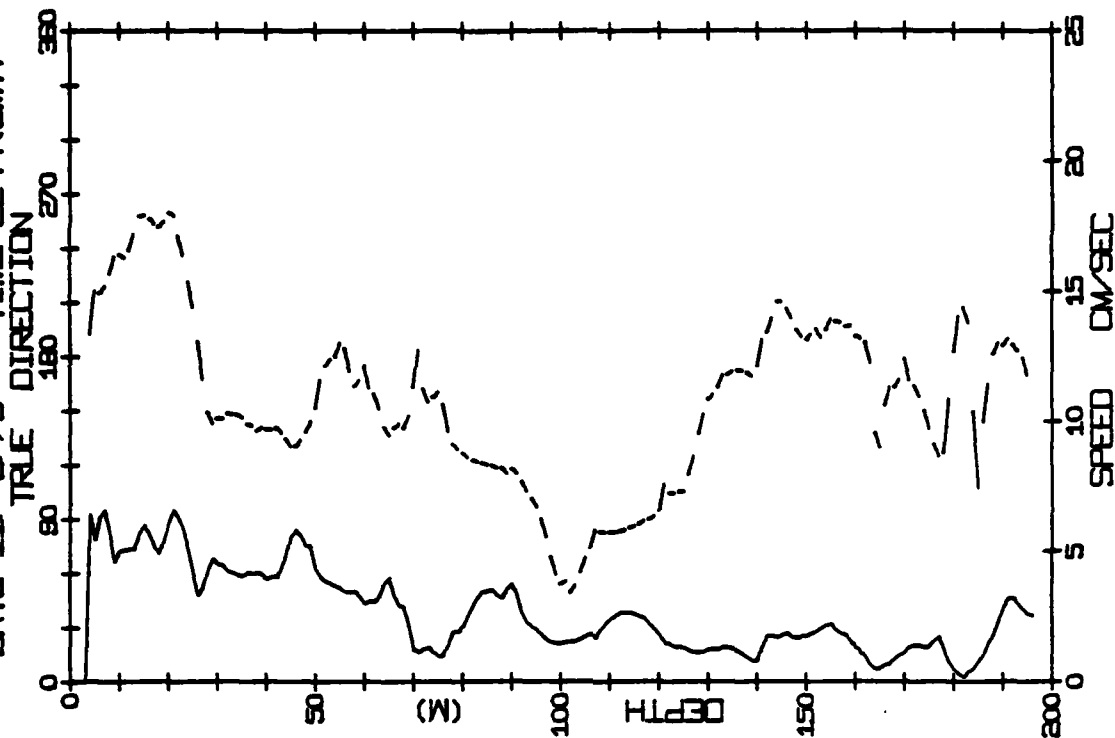
SNOWBIRD STATION 173 (100M.) 11/AUG/75 211 CRT
 LAT= 75.106N LONG= 145.8338W LTER= 0. LOER= 0.
 NIVEL= -7.0 NVER= 0. EVER= 0.

DPT	SPD	DRN
101	100	100
102	100	100
103	100	100
104	100	100
105	100	100
106	100	100
107	100	100
108	100	100
109	100	100
110	100	100
111	100	100
112	100	100
113	100	100
114	100	100
115	100	100
116	100	100
117	100	100
118	100	100
119	100	100
120	100	100
121	100	100
122	100	100
123	100	100
124	100	100
125	100	100
126	100	100
127	100	100
128	100	100
129	100	100
130	100	100
131	100	100
132	100	100
133	100	100
134	100	100
135	100	100
136	100	100
137	100	100
138	100	100
139	100	100
140	100	100
141	100	100
142	100	100
143	100	100
144	100	100
145	100	100
146	100	100
147	100	100
148	100	100
149	100	100
150	100	100
151	100	100
152	100	100
153	100	100
154	100	100
155	100	100
156	100	100
157	100	100
158	100	100
159	100	100
160	100	100
161	100	100
162	100	100
163	100	100
164	100	100
165	100	100
166	100	100
167	100	100
168	100	100
169	100	100
170	100	100
171	100	100
172	100	100
173	100	100
174	100	100
175	100	100
176	100	100
177	100	100
178	100	100
179	100	100
180	100	100
181	100	100
182	100	100
183	100	100
184	100	100
185	100	100
186	100	100
187	100	100
188	100	100
189	100	100
190	100	100
191	100	100
192	100	100
193	100	100
194	100	100
195	100	100
196	100	100
197	100	100
198	100	100
199	100	100
200	100	100

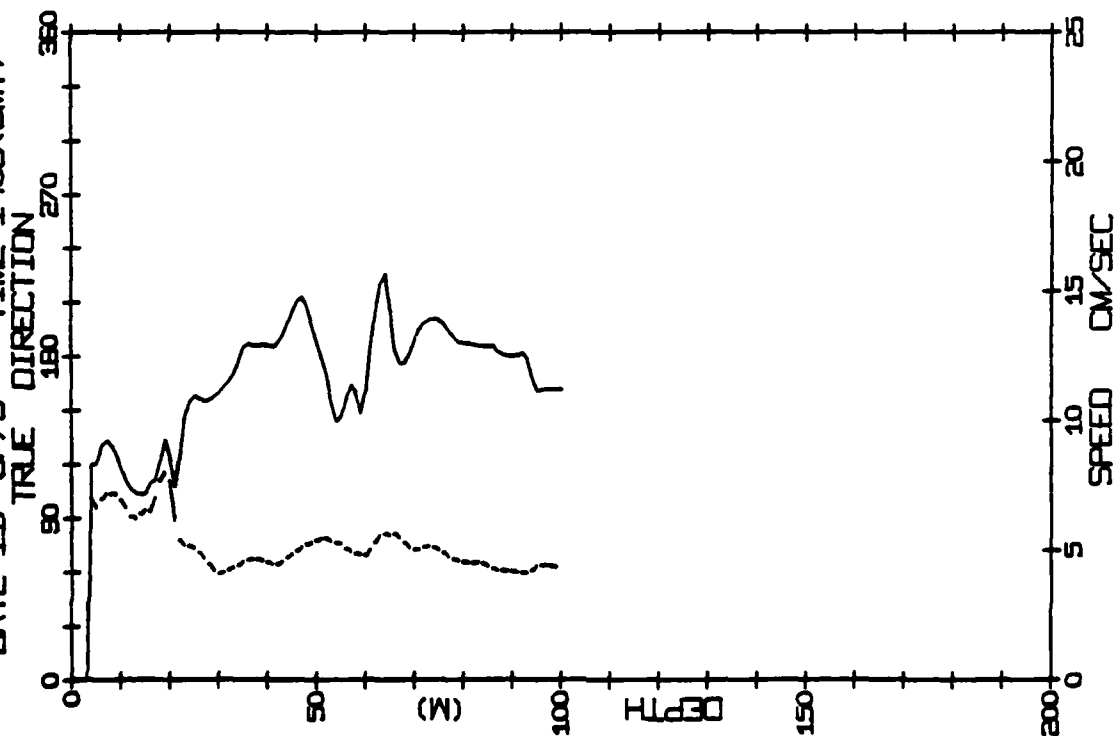
SNOWBIRD STATION 174 (172M.) 11/AUG/75 544 CRT
 LAT= 75.080N LONG= 145.7735W LTER= 16. LOER= 32.
 NIVEL= -23.8 NVER= 0. EVER= 1.

DPT	SPD	DRN
101	100	100
102	100	100
103	100	100
104	100	100
105	100	100
106	100	100
107	100	100
108	100	100
109	100	100
110	100	100
111	100	100
112	100	100
113	100	100
114	100	100
115	100	100
116	100	100
117	100	100
118	100	100
119	100	100
120	100	100
121	100	100
122	100	100
123	100	100
124	100	100
125	100	100
126	100	100
127	100	100
128	100	100
129	100	100
130	100	100
131	100	100
132	100	100
133	100	100
134	100	100
135	100	100
136	100	100
137	100	100
138	100	100
139	100	100
140	100	100
141	100	100
142	100	100
143	100	100
144	100	100
145	100	100
146	100	100
147	100	100
148	100	100
149	100	100
150	100	100
151	100	100
152	100	100
153	100	100
154	100	100
155	100	100
156	100	100
157	100	100
158	100	100
159	100	100
160	100	100
161	100	100
162	100	100
163	100	100
164	100	100
165	100	100
166	100	100
167	100	100
168	100	100
169	100	100
170	100	100
171	100	100
172	100	100
173	100	100
174	100	100
175	100	100
176	100	100
177	100	100
178	100	100
179	100	100
180	100	100
181	100	100
182	100	100
183	100	100
184	100	100
185	100	100
186	100	100
187	100	100
188	100	100
189	100	100
190	100	100
191	100	100
192	100	100
193	100	100
194	100	100
195	100	100
196	100	100
197	100	100
198	100	100
199	100	100
200	100	100

CAMP SNOWBIRD STATION 176
DATE 11/ 8/75 TIME 2244(GMT)

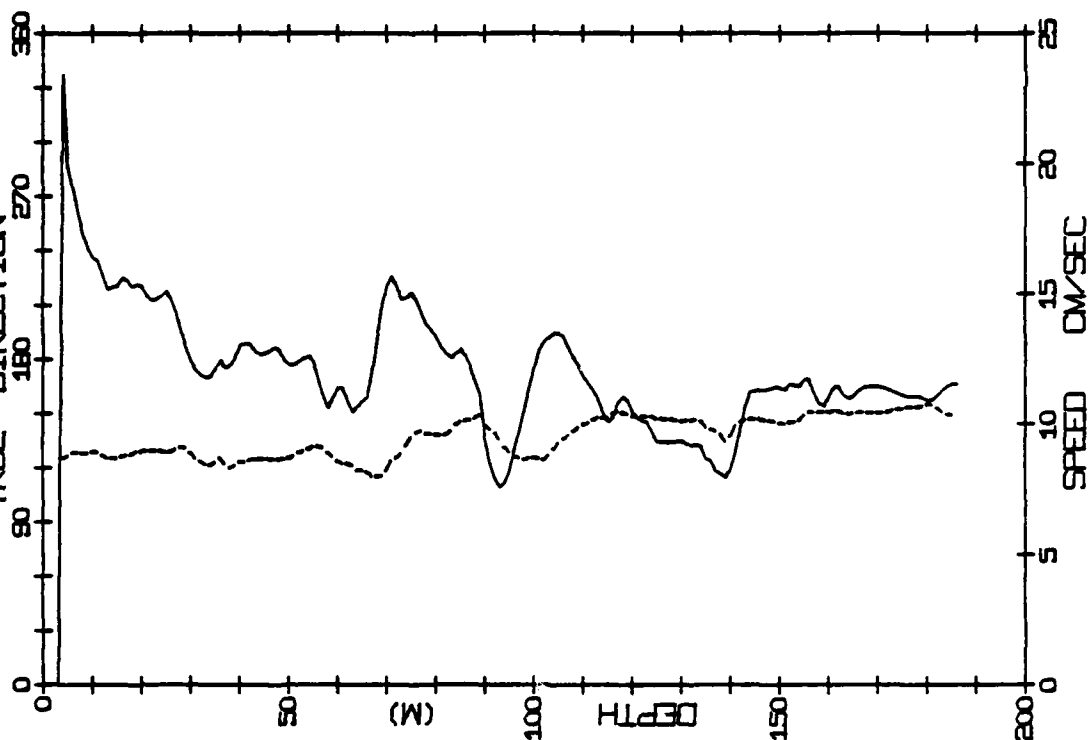


CAMP SNOWBIRD STATION 175
DATE 11/ 8/75 TIME 1408(GMT)



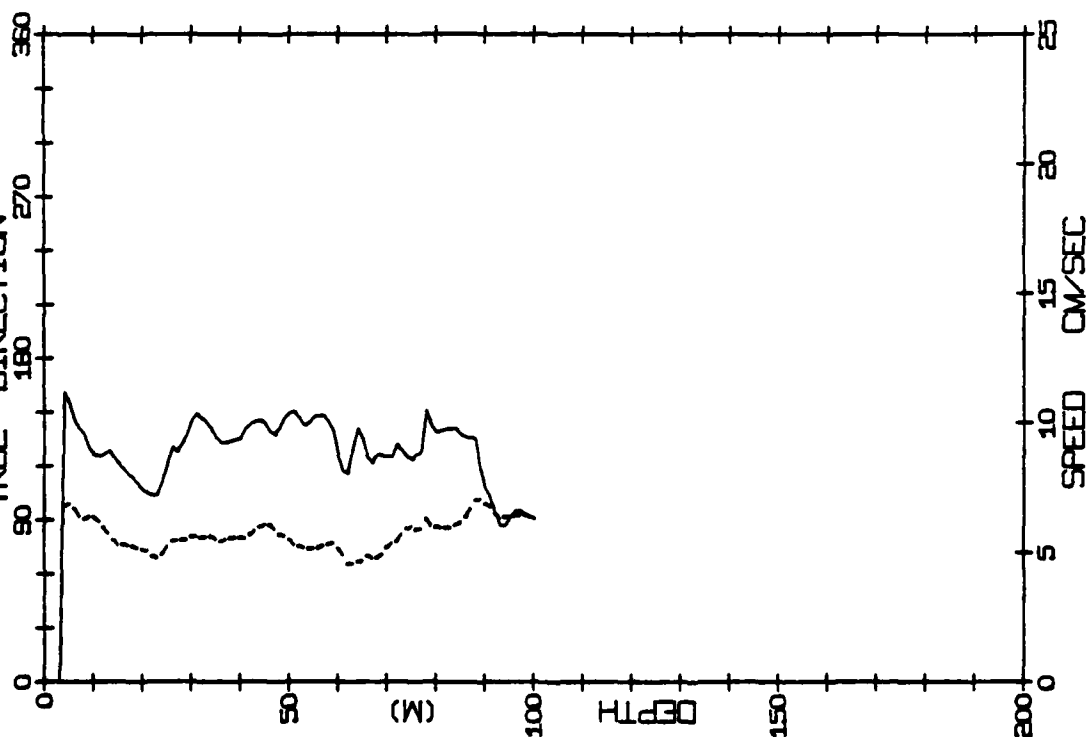
CAMP SNOWBIRD STATION 178
DATE 12/ 8/75 TIME 543(GMT)

TRUE DIRECTION



CAMP SNOWBIRD STATION 177
DATE 12/ 8/75 TIME 211(GMT)

TRUE DIRECTION

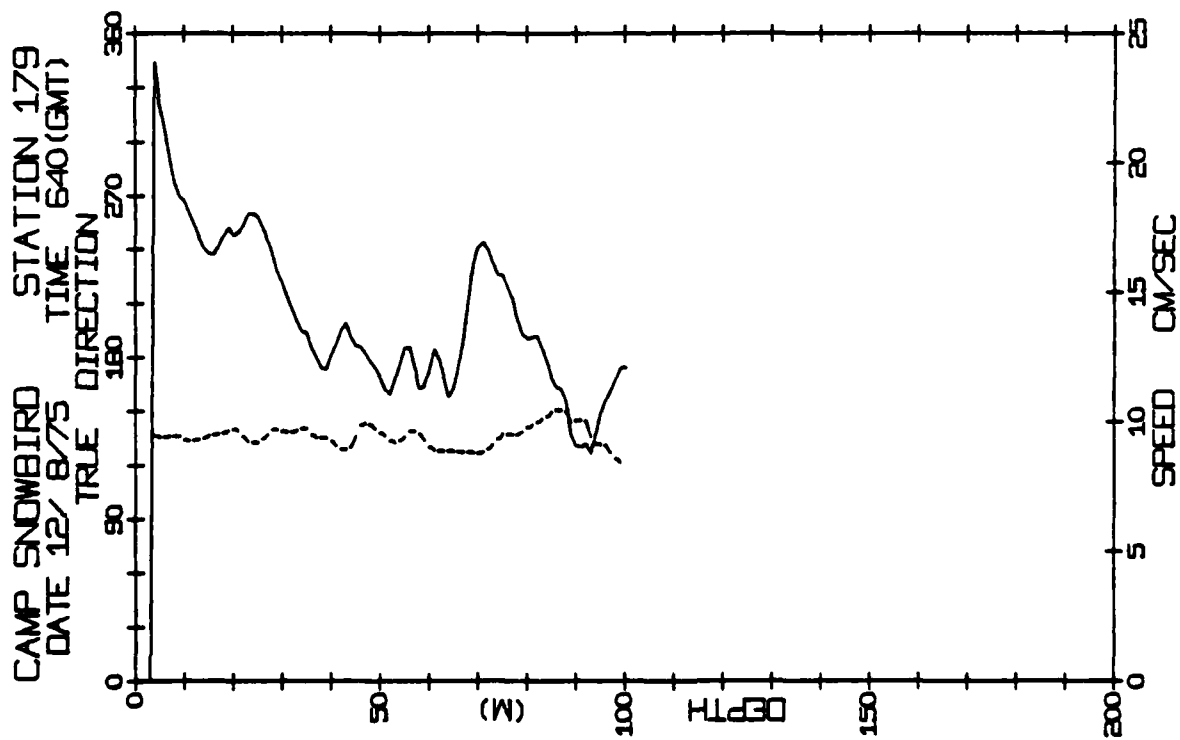


SNOWBIRD STATION 177 (100M)
 LAT=75.0042N LONG=145.5157W
 NIVEL=18.0
 12/AUG/75
 LTER=2
 NVER=0
 211 GMT
 LGER=4
 EVER=0

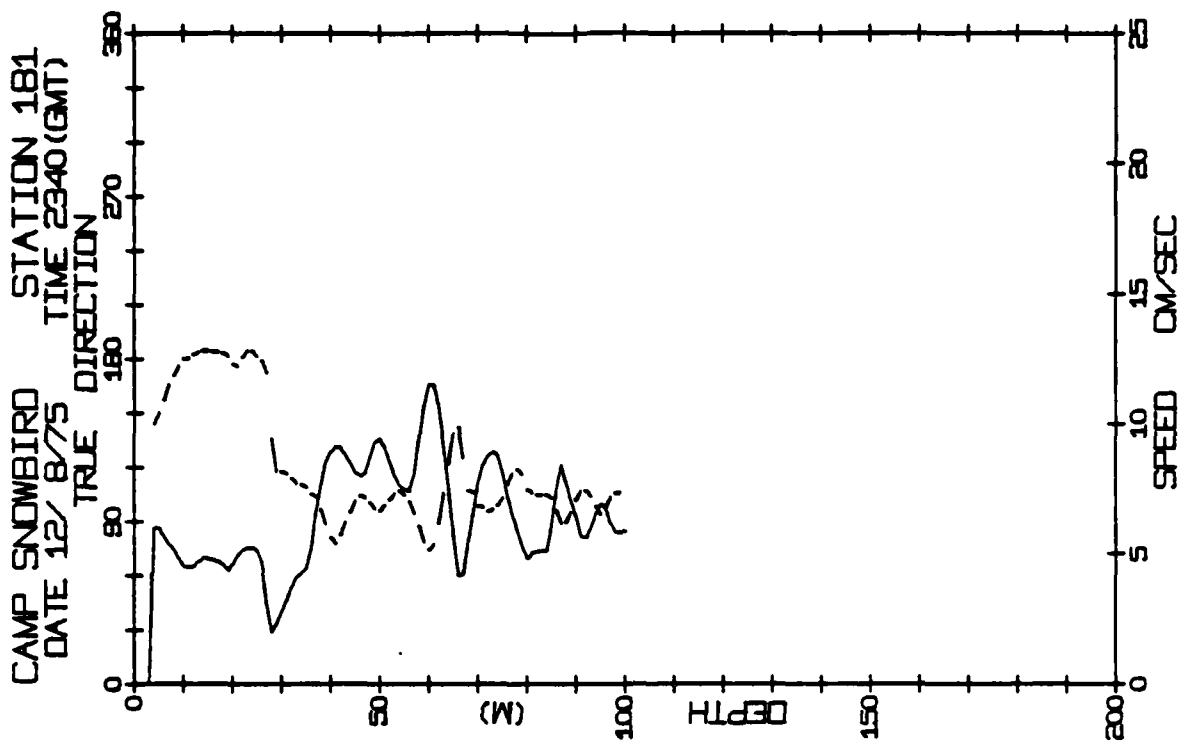
DPT	SPD	DRN
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	0	0
80	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
99	0	0
100	0	0

SNOWBIRD STATION 178 (186M)
 LAT=75.0042N LONG=145.4203W
 NIVEL=22.0
 12/AUG/75
 LTER=2
 NVER=0
 543 GMT
 LGER=0
 EVER=0

DPT	SPD	DRN
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0
37	0	0
38	0	0
39	0	0
40	0	0
41	0	0
42	0	0
43	0	0
44	0	0
45	0	0
46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	0	0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	0	0
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	0	0
80	0	0
81	0	0
82	0	0
83	0	0
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	0	0
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0
96	0	0
97	0	0
98	0	0
99	0	0
100	0	0



198



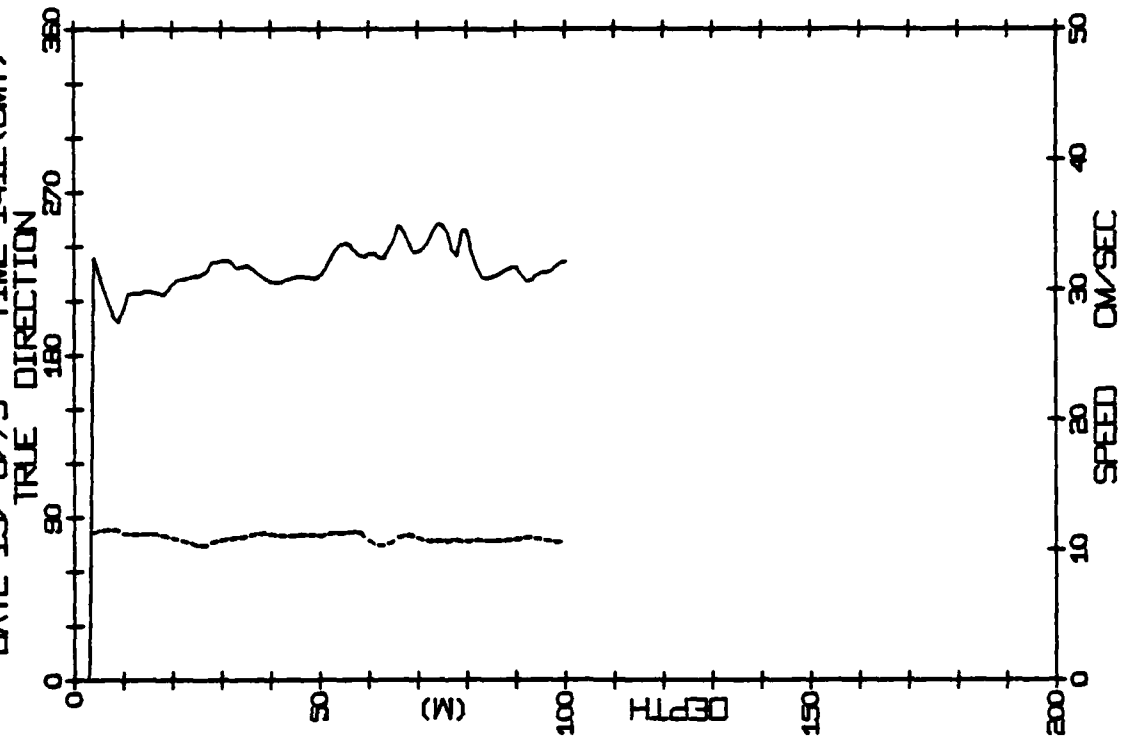
SNOWBIRD STATION 181 (100M)
 LAT=74.9805N LONG=145.1272W
 NVEL=1.3 EVEL=3.5 LTER=2 LGER=3
 12/AUG/75 2340 GMT

DPT	SPD	DPT	SPD	DRN
0	1	2	3	4
1	2	3	4	5
2	3	4	5	6
3	4	5	6	7
4	5	6	7	8
5	6	7	8	9
6	7	8	9	10
7	8	9	10	11
8	9	10	11	12
9	10	11	12	13
10	11	12	13	14
11	12	13	14	15
12	13	14	15	16
13	14	15	16	17
14	15	16	17	18
15	16	17	18	19
16	17	18	19	20
17	18	19	20	21
18	19	20	21	22
19	20	21	22	23
20	21	22	23	24
21	22	23	24	25
22	23	24	25	26
23	24	25	26	27
24	25	26	27	28
25	26	27	28	29
26	27	28	29	30
27	28	29	30	31
28	29	30	31	32
29	30	31	32	33
30	31	32	33	34
31	32	33	34	35
32	33	34	35	36
33	34	35	36	37
34	35	36	37	38
35	36	37	38	39
36	37	38	39	40
37	38	39	40	41
38	39	40	41	42
39	40	41	42	43
40	41	42	43	44
41	42	43	44	45
42	43	44	45	46
43	44	45	46	47
44	45	46	47	48
45	46	47	48	49
46	47	48	49	50
47	48	49	50	51
48	49	50	51	52
49	50	51	52	53
50	51	52	53	54
51	52	53	54	55
52	53	54	55	56
53	54	55	56	57
54	55	56	57	58
55	56	57	58	59
56	57	58	59	60
57	58	59	60	61
58	59	60	61	62
59	60	61	62	63
60	61	62	63	64
61	62	63	64	65
62	63	64	65	66
63	64	65	66	67
64	65	66	67	68
65	66	67	68	69
66	67	68	69	70
67	68	69	70	71
68	69	70	71	72
69	70	71	72	73
70	71	72	73	74
71	72	73	74	75
72	73	74	75	76
73	74	75	76	77
74	75	76	77	78
75	76	77	78	79
76	77	78	79	80
77	78	79	80	81
78	79	80	81	82
79	80	81	82	83
80	81	82	83	84
81	82	83	84	85
82	83	84	85	86
83	84	85	86	87
84	85	86	87	88
85	86	87	88	89
86	87	88	89	90
87	88	89	90	91
88	89	90	91	92
89	90	91	92	93
90	91	92	93	94
91	92	93	94	95
92	93	94	95	96
93	94	95	96	97
94	95	96	97	98
95	96	97	98	99
96	97	98	99	100

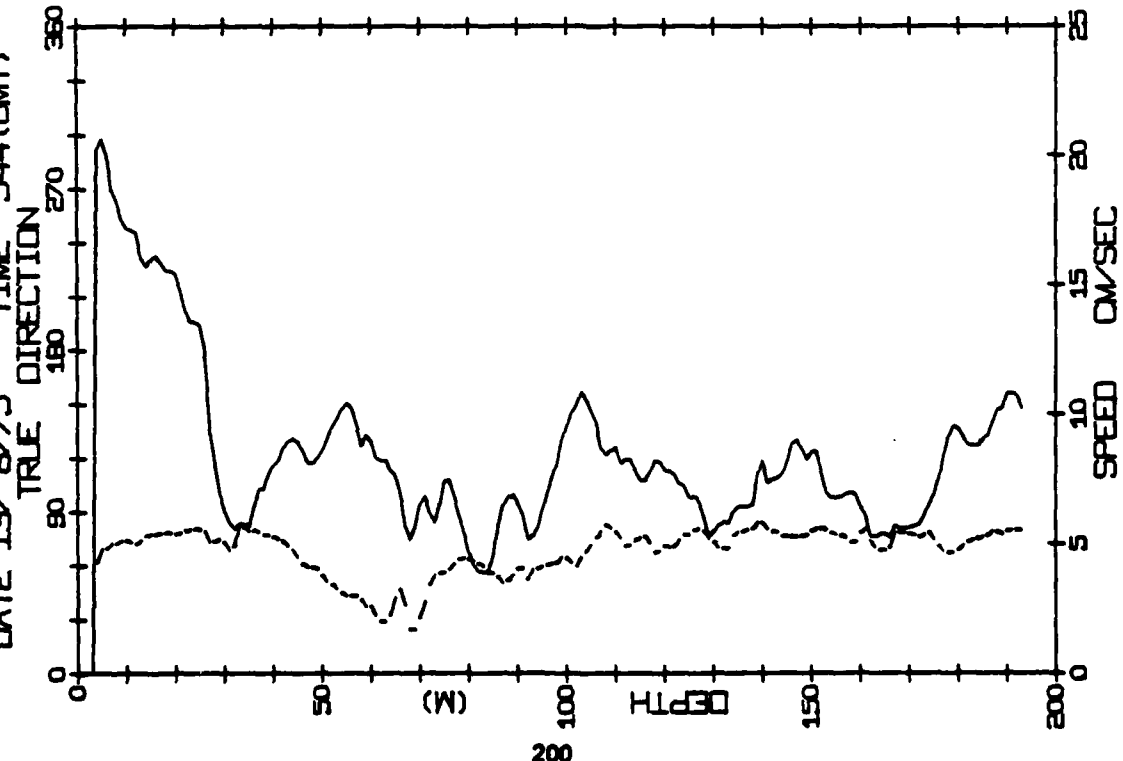
SNOWBIRD STATION 179 (100M)
 LAT=75.005N LONG=145.3956W
 NVEL=1.3 EVEL=3.5 LTER=2 LGER=3
 12/AUG/75 2340 GMT

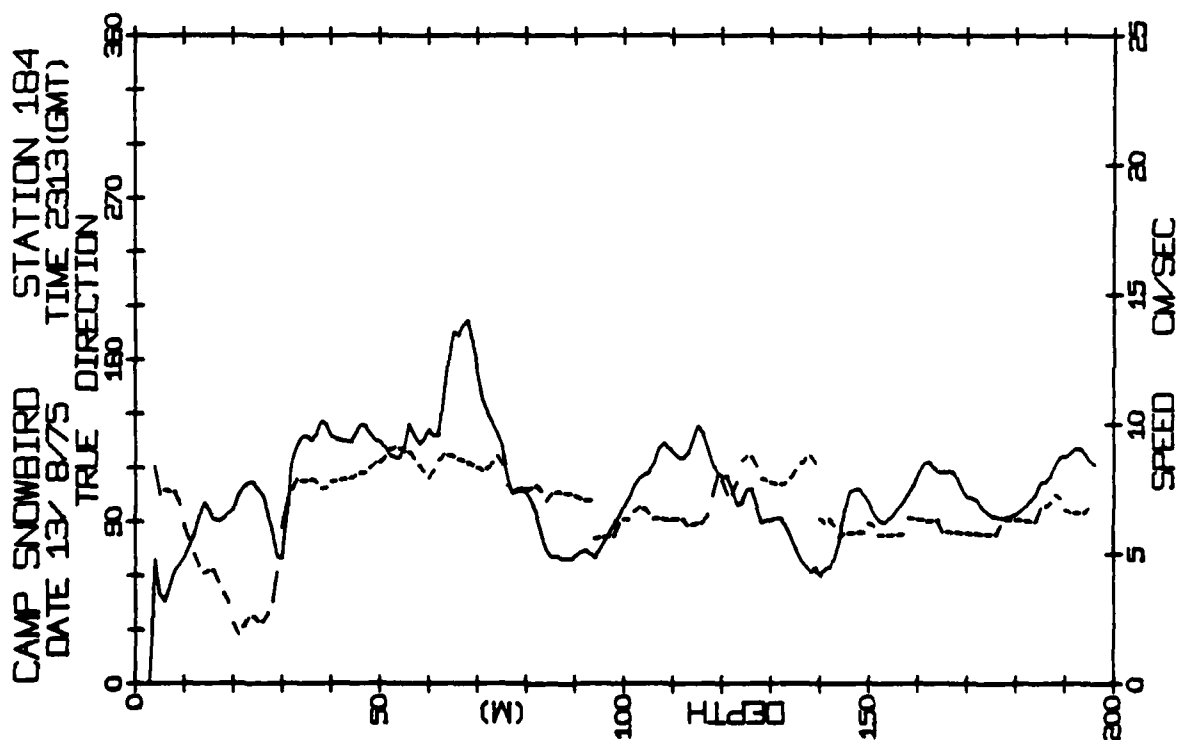
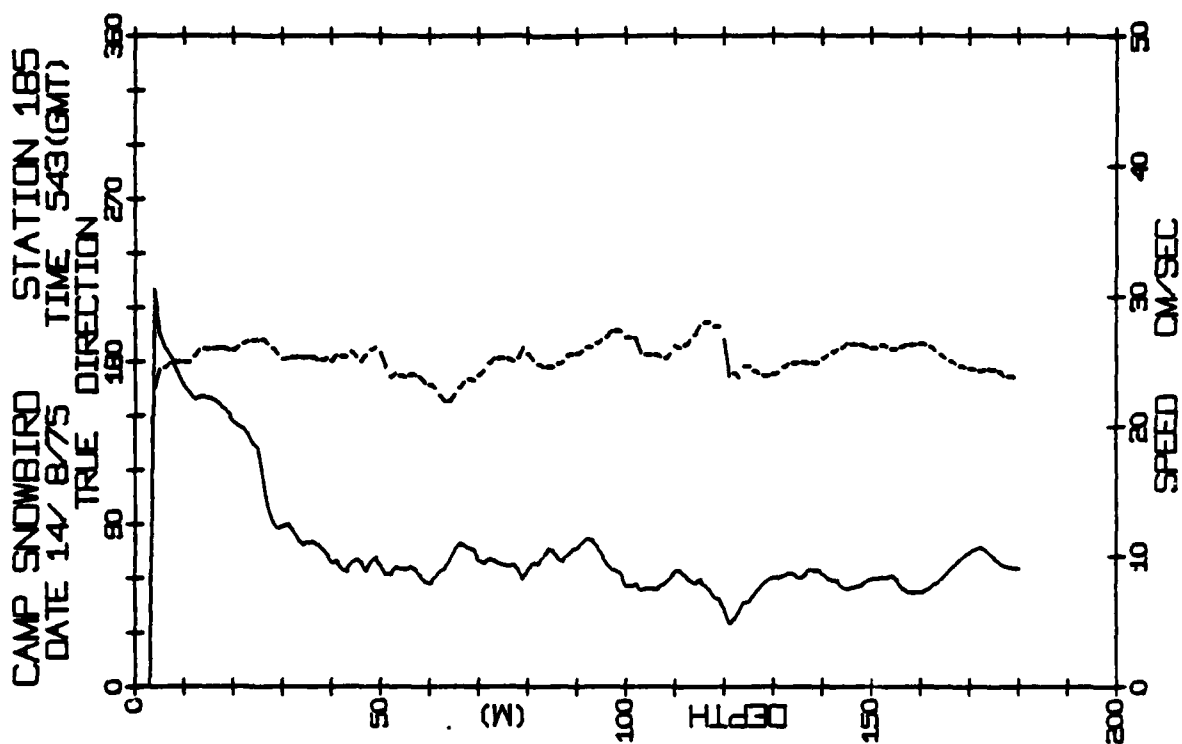
DPT	SPD	DPT	SPD	DRN
0	1	2	3	4
1	2	3	4	5
2	3	4	5	6
3	4	5	6	7
4	5	6	7	8
5	6	7	8	9
6	7	8	9	10
7	8	9	10	11
8	9	10	11	12
9	10	11	12	13
10	11	12	13	14
11	12	13	14	15
12	13	14	15	16
13	14	15	16	17
14	15	16	17	18
15	16	17	18	19
16	17	18	19	20
17	18	19	20	21
18	19	20	21	22
19	20	21	22	23
20	21	22	23	24
21	22	23	24	25
22	23	24	25	26
23	24	25	26	27
24	25	26	27	28
25	26	27	28	29
26	27	28	29	30
27	28	29	30	31
28	29	30	31	32
29	30	31	32	33
30	31	32	33	34
31	32	33	34	35
32	33	34	35	36
33	34	35	36	37
34	35	36	37	38
35	36	37	38	39
36	37	38	39	40
37	38	39	40	41
38	39	40	41	42
39	40	41	42	43
40	41	42	43	44
41	42	43	44	45
42	43	44	45	46
43	44	45	46	47
44	45	46	47	48
45	46	47	48	49
46	47	48	49	50
47	48	49	50	51
48	49	50	51	52
49	50	51	52	53
50	51	52	53	54
51	52	53	54	55
52	53	54	55	56
53	54	55	56	57
54	55	56	57	58
55	56	57	58	59
56	57	58	59	60
57	58	59	60	61
58	59	60	61	62
59	60	61	62	63
60	61	62	63	64
61	62	63	64	65
62	63	64	65	66
63	64	65	66	67
64	65	66	67	68
65	66	67	68	69
66	67	68	69	70
67	68	69	70	71
68	69	70	71	72
69	70	71	72	73
70	71	72	73	74
71	72	73	74	75
72	73	74	75	76
73	74	75	76	77
74	75	76	77	78
75	76	77	78	79
76	77	78	79	80
77	78	79	80	81
78	79	80	81	82
79	80	81	82	83
80	81	82	83	84
81	82	83	84	85
82	83	84	85	86
83	84	85	86	87
84	85	86	87	88
85	86	87	88	89
86	87	88	89	90
87	88	89	90	91
88	89	90	91	92
89	90	91	92	93
90	91	92	93	94
91	92	93	94	95
92	93	94	95	96
93	94	95	96	97
94	95	96	97	98
95	96	97	98	99
96	97	98	99	100

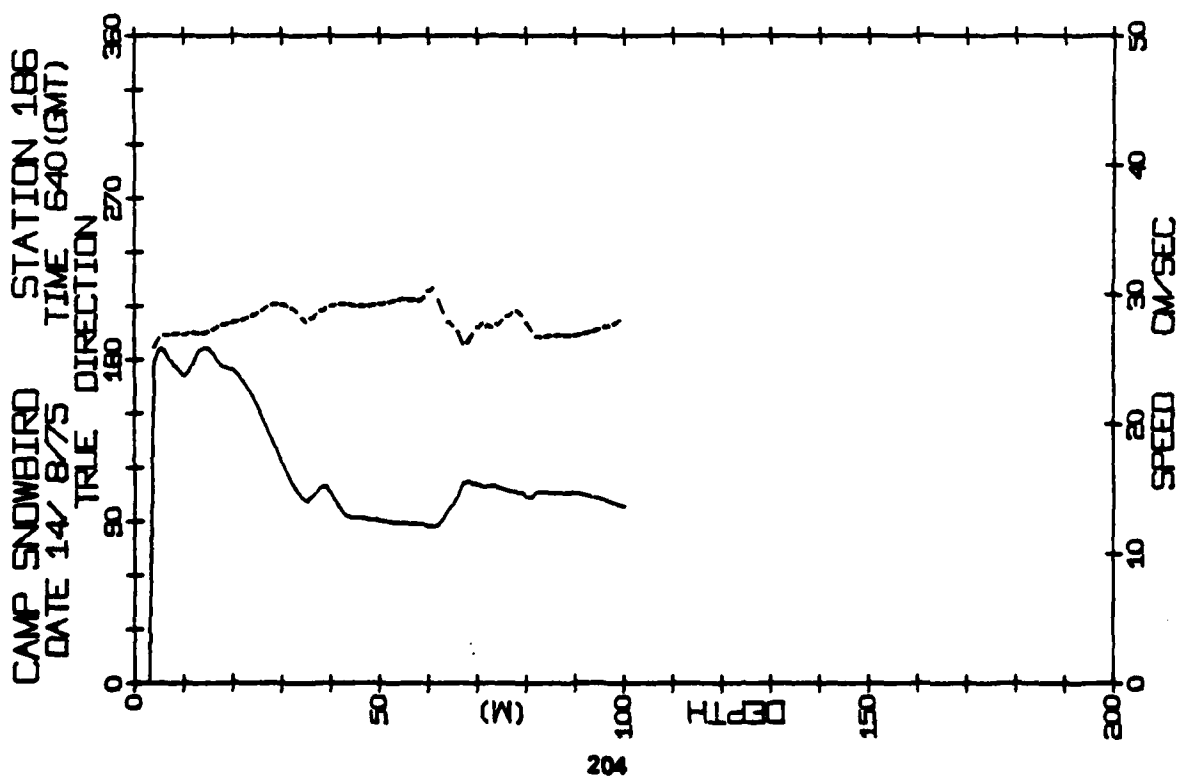
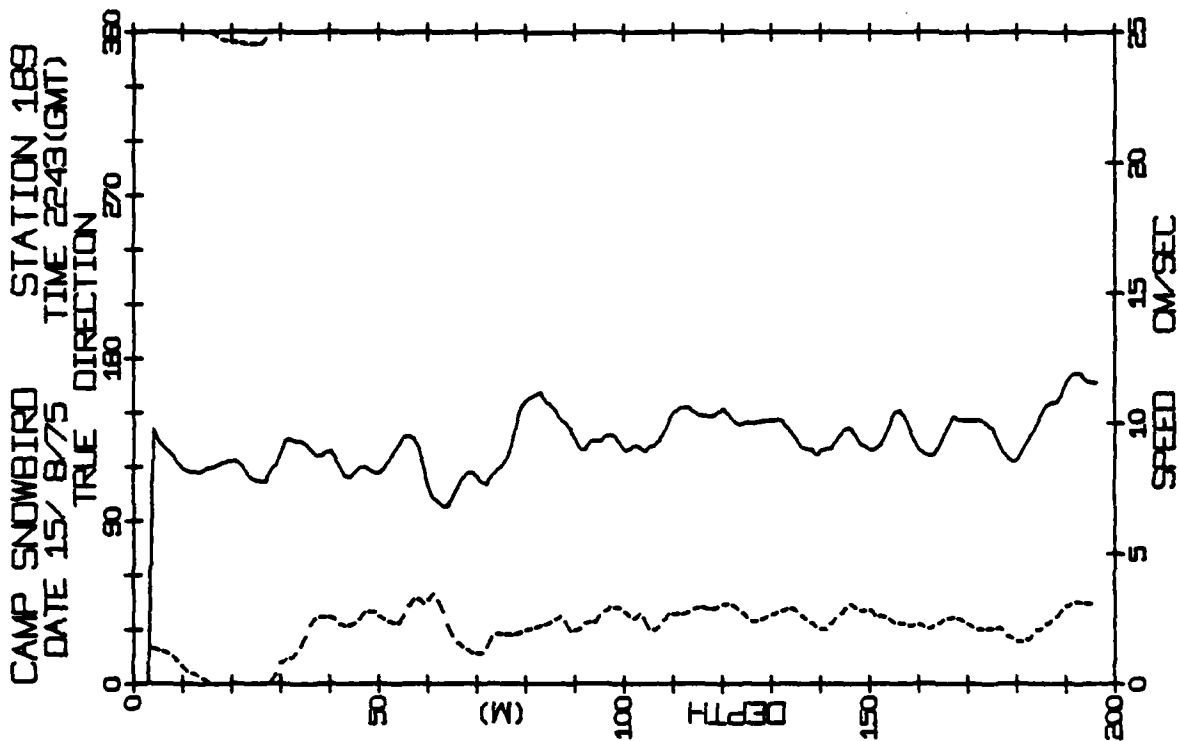
CAMP SNOWBIRD STATION 183
 DATE 13/ 8/75 TIME 1412(GMT)



CAMP SNOWBIRD STATION 182
 DATE 13/ 8/75 TIME 544(GMT)



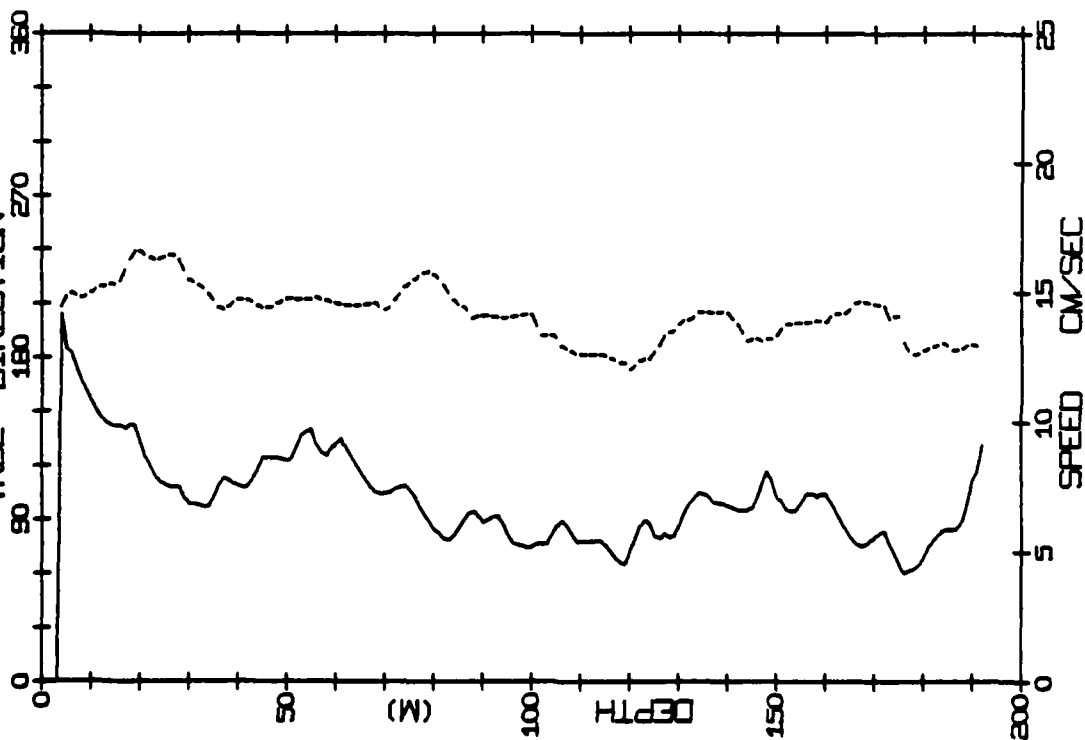




CAMP SNOWBIRD
DATE 16/ 8/75

STATION 191
TIME 2243(GMT)

TRUE DIRECTION

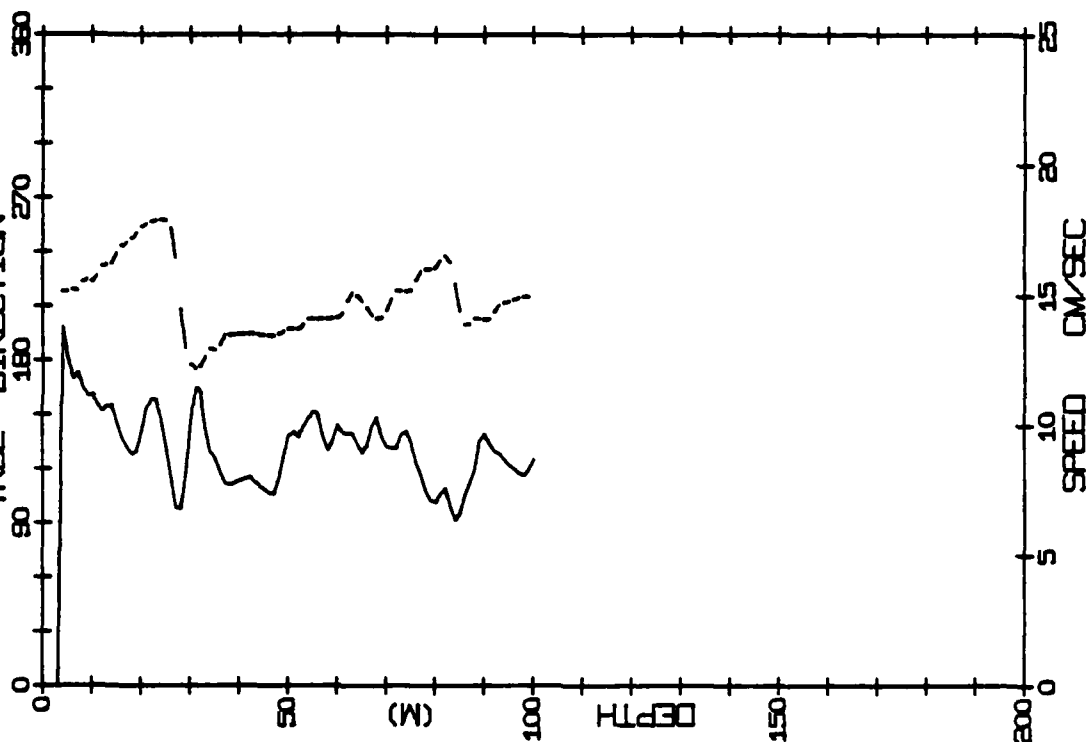


208

CAMP SNOWBIRD
DATE 16/ 8/75

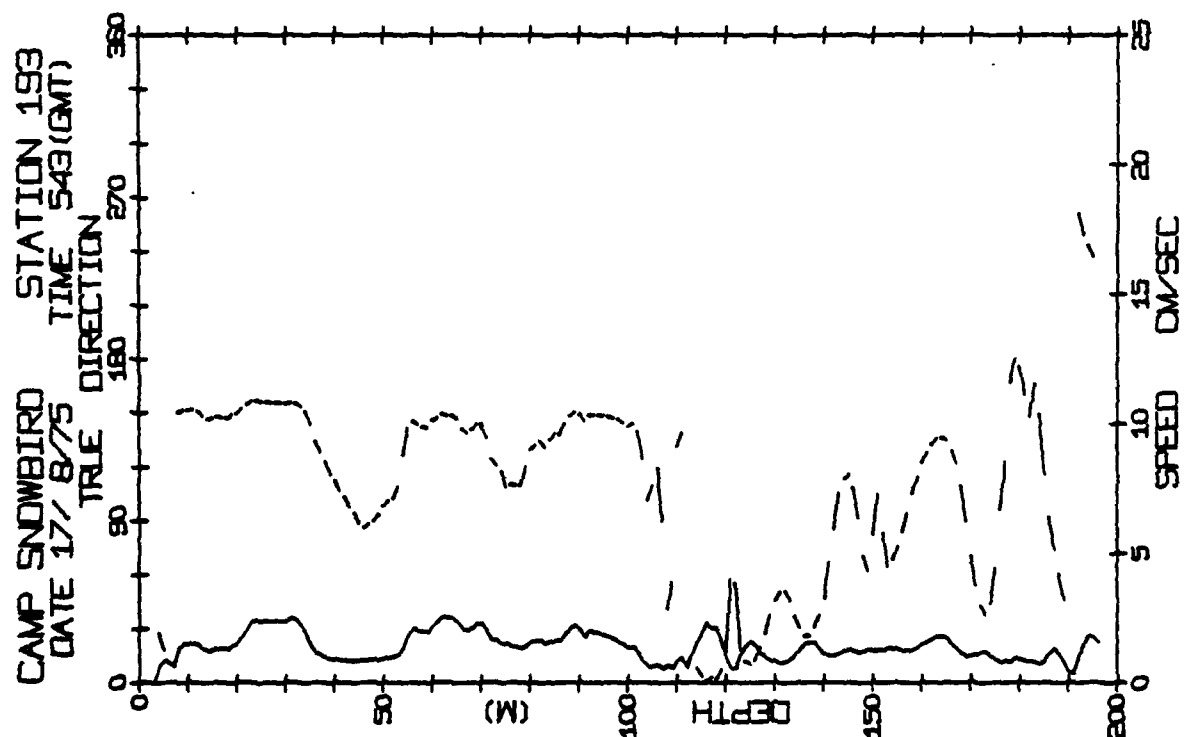
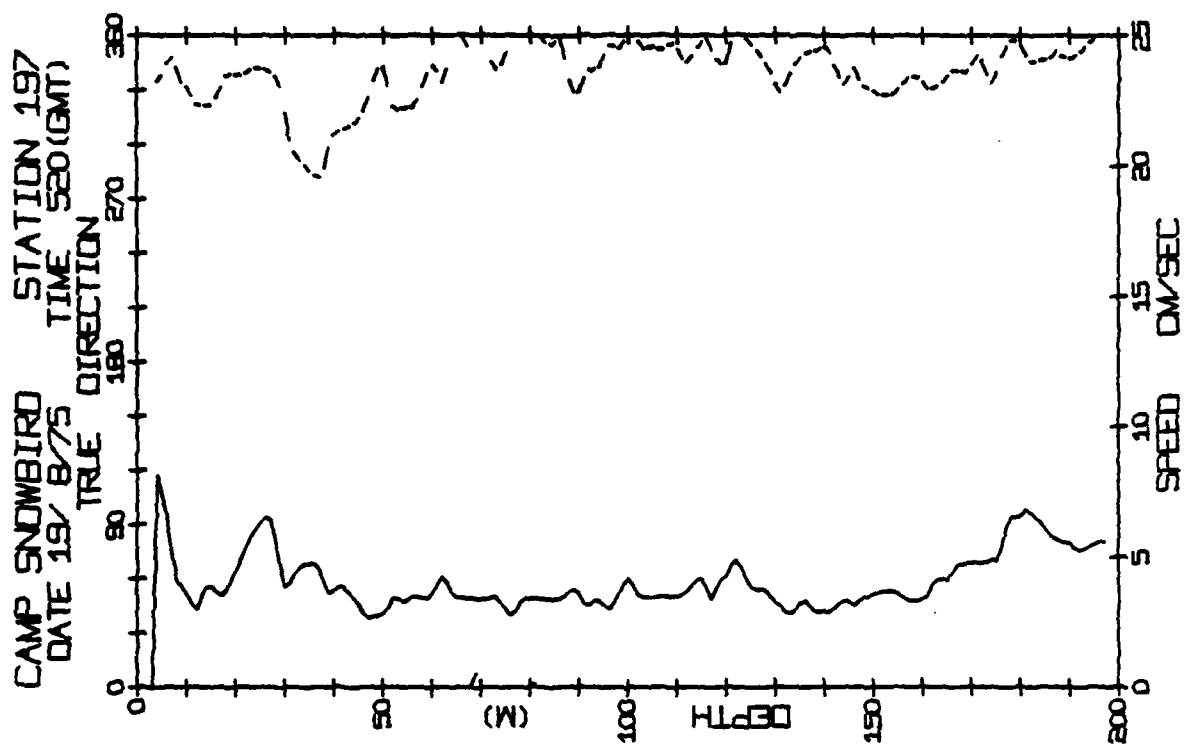
STATION 192
TIME 2342(GMT)

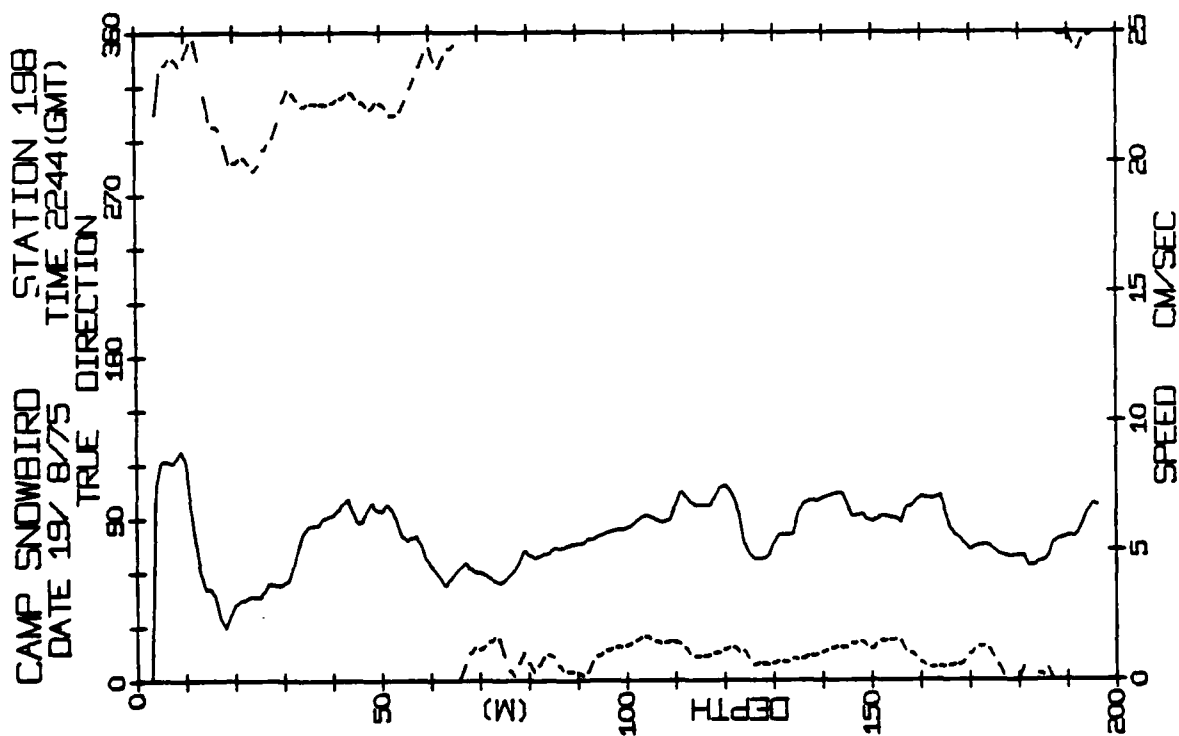
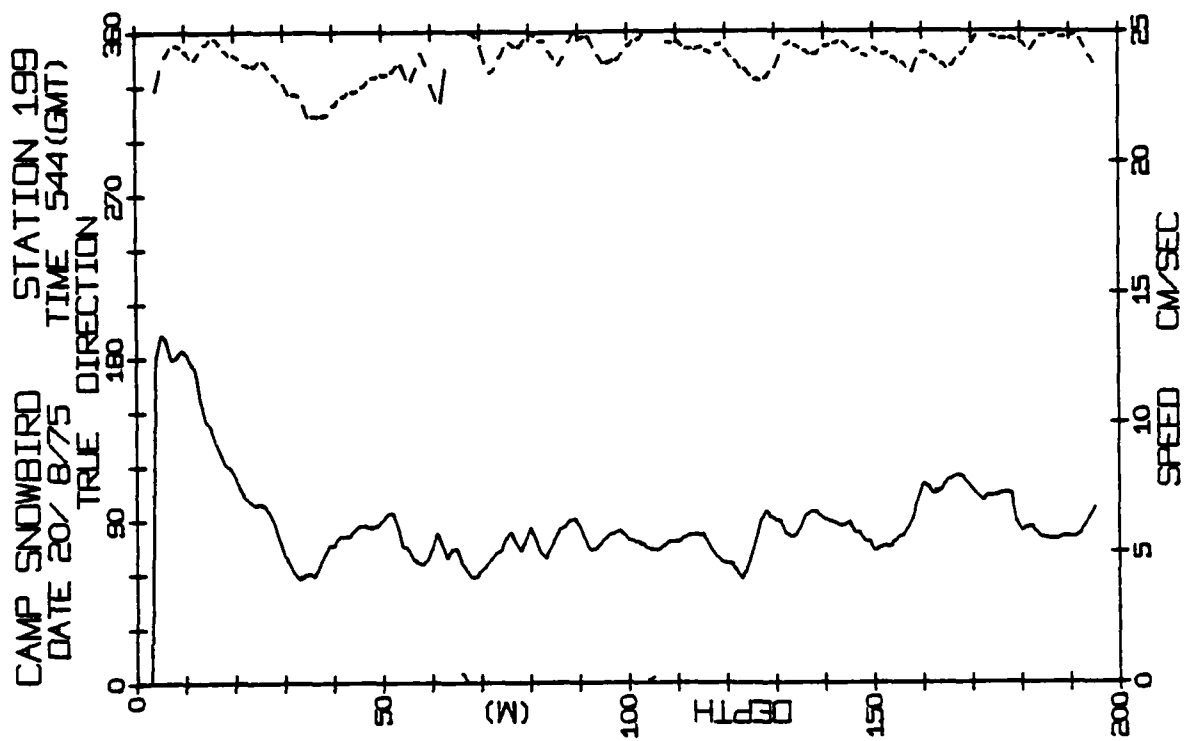
TRUE DIRECTION

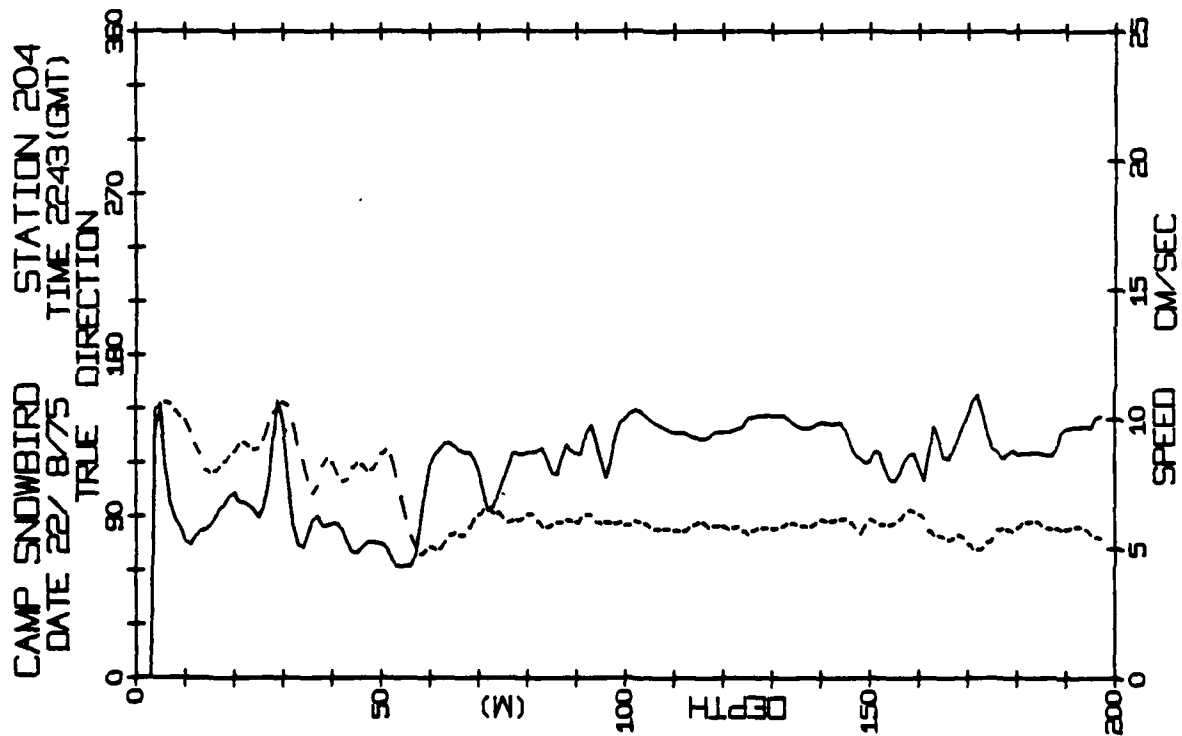
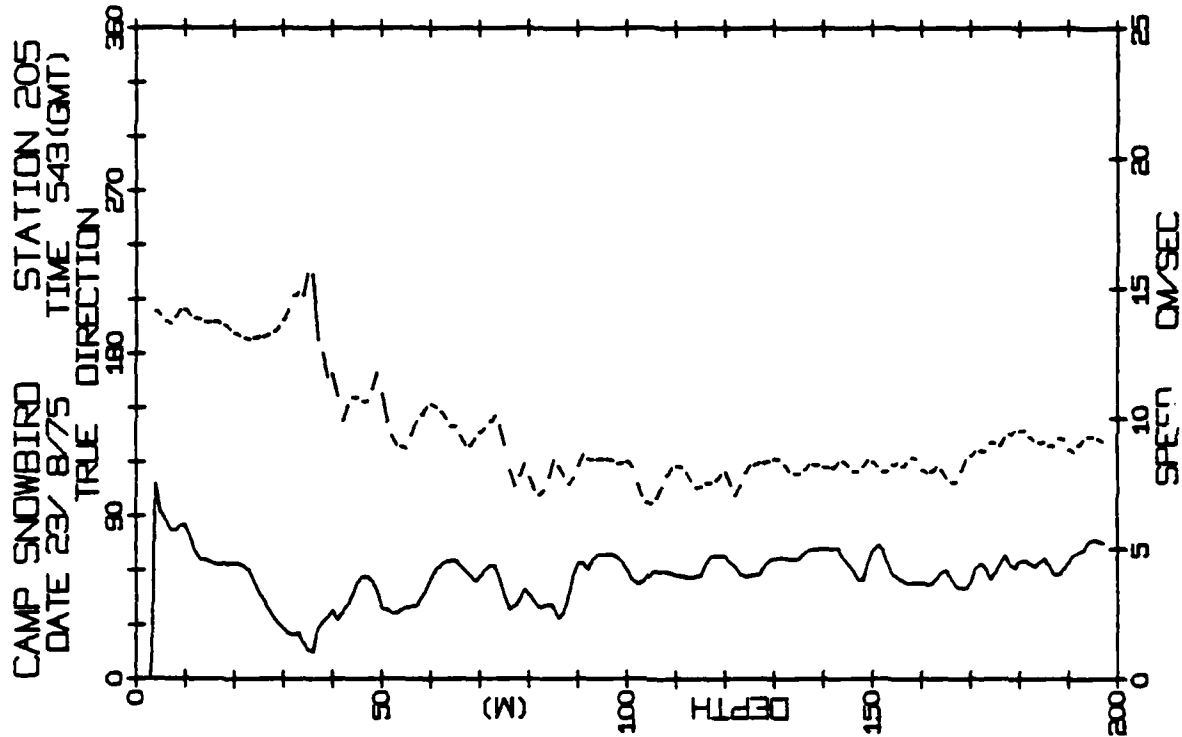


SNOWBIRD STATION 192 (100M.) 16/AUG/75 2342 GMT
LAT= 75.0396N LONG= 144.1066W LTER= 0. LGER= 1
NIVEL= -16.4 EIVEL= -7.1 NVER= 0. EVER= 0.

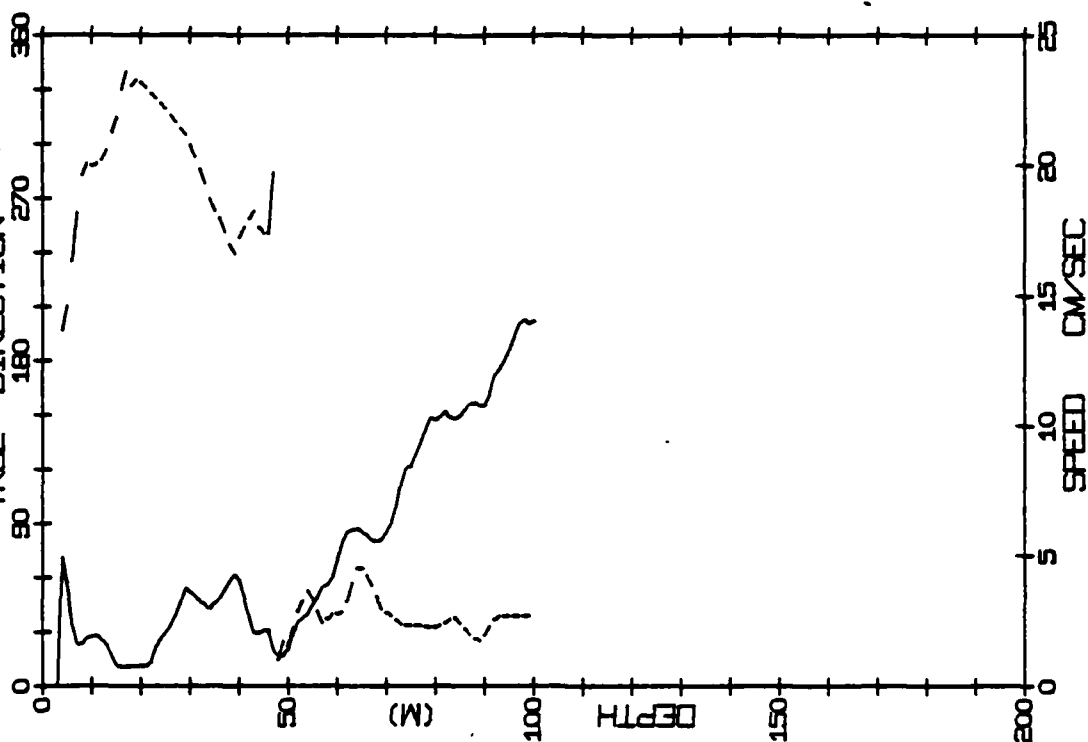
SNOWBIRD STATION 191 (192M.) 16/AUG/75 2243 GMT
LAT= 75.0450N LONG= 144.0983W LTER= 1. LGER= 2.
NIVEL= -17.4 EIVEL= -5.7 NVER= 0. EVER= 0.



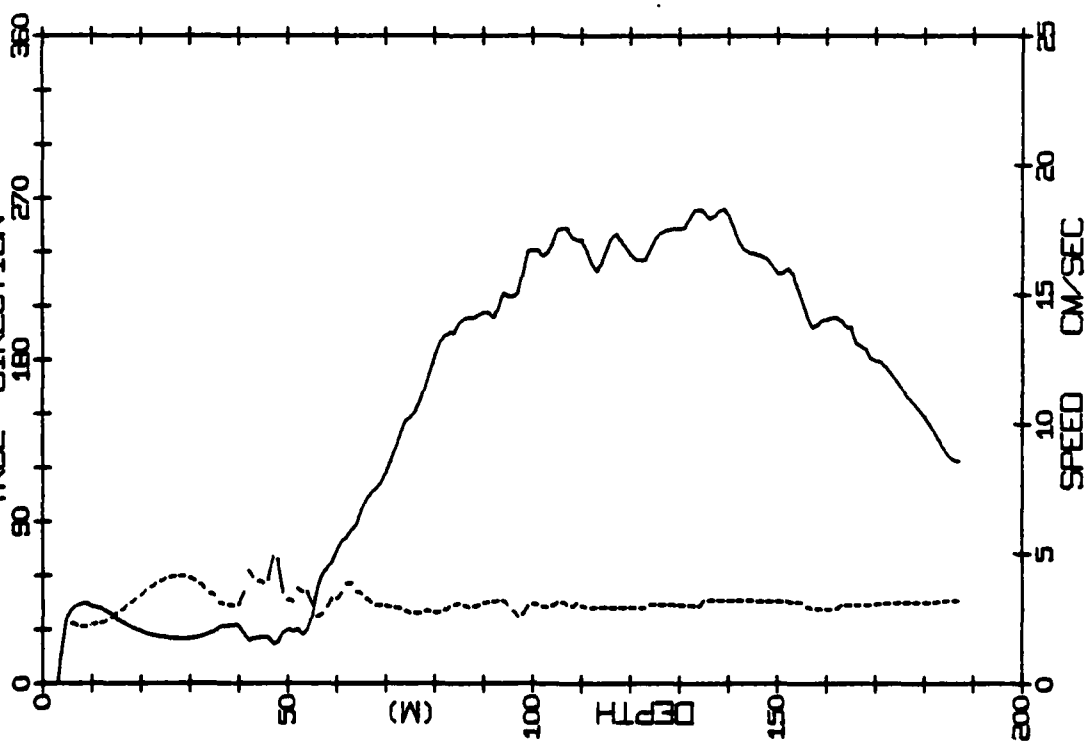




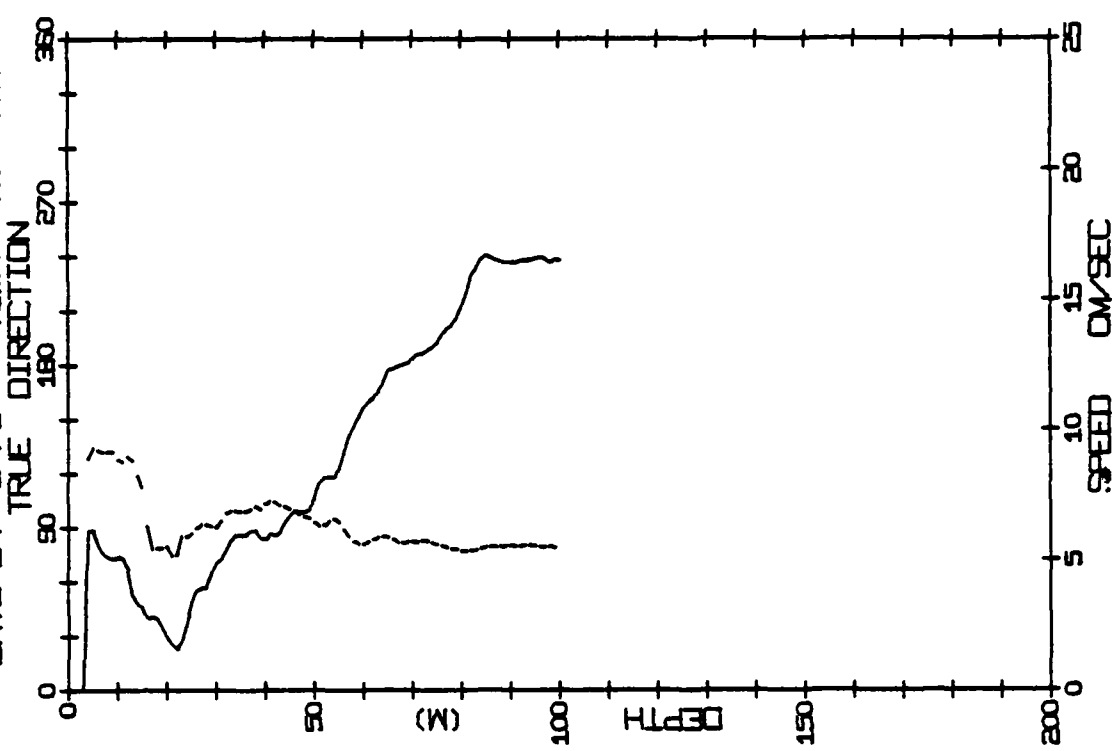
CAMP SNOWBIRD STATION 207
 DATE 23/ 8/75 TIME 2339(GMT)
 TRUE DIRECTION



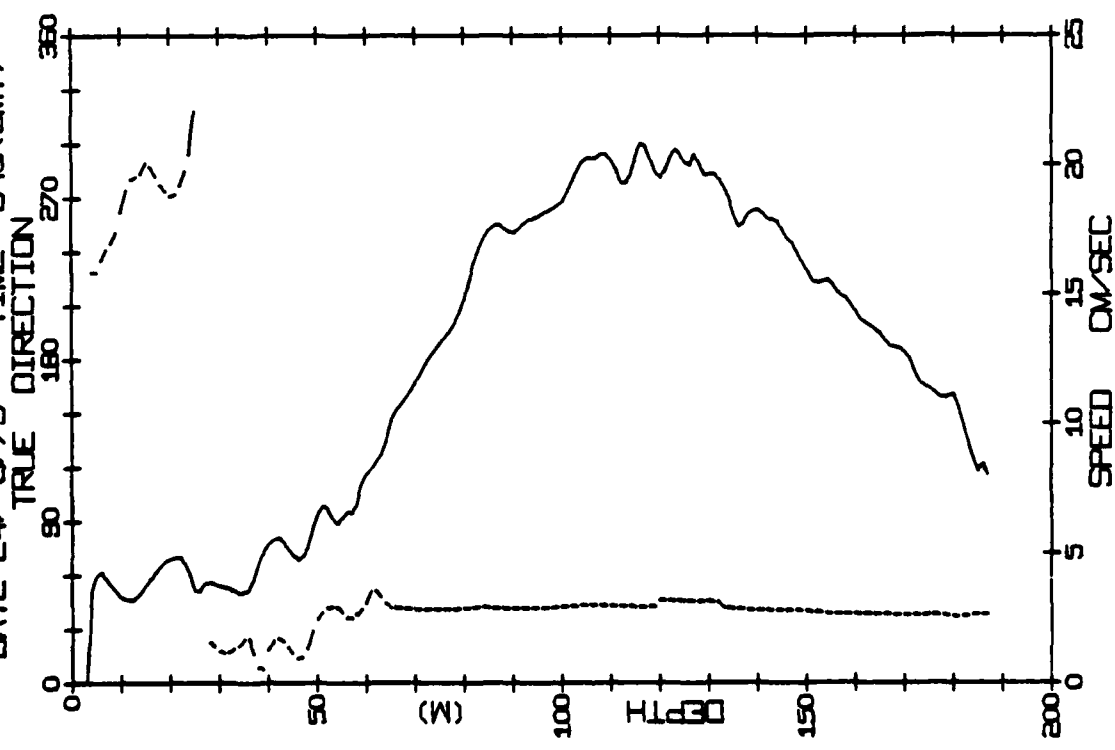
CAMP SNOWBIRD STATION 206
 DATE 23/ 8/75 TIME 2244(GMT)
 TRUE DIRECTION

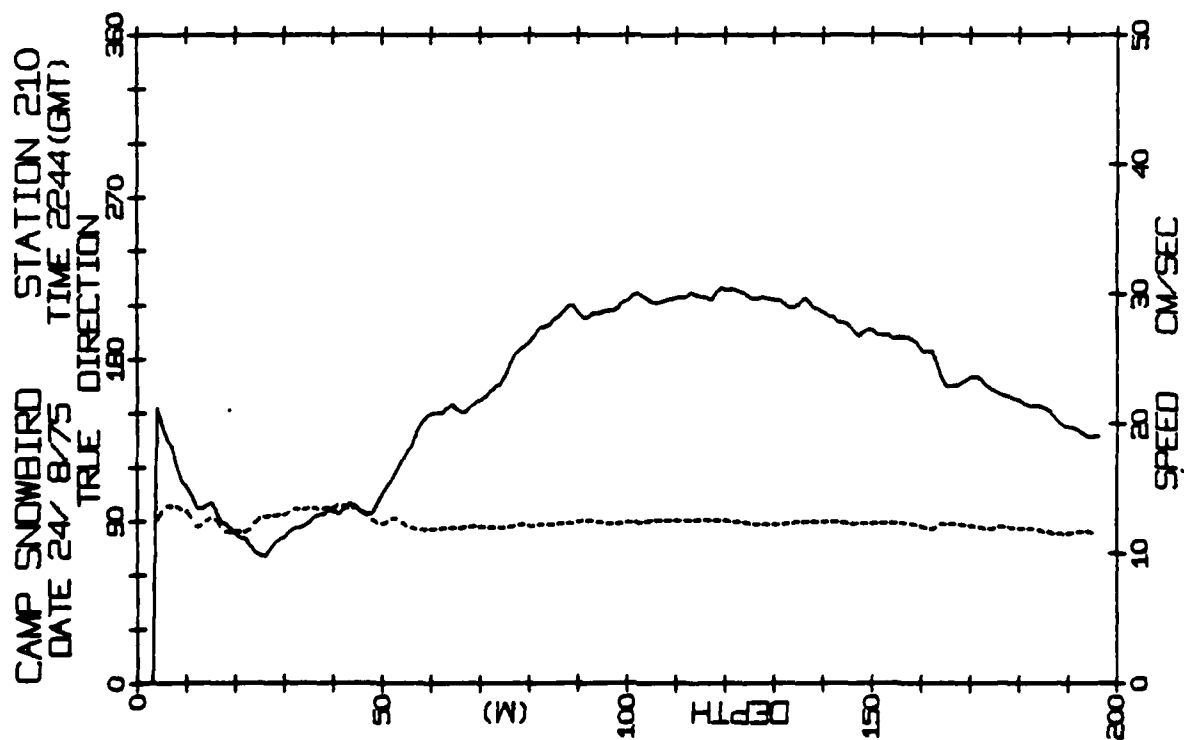
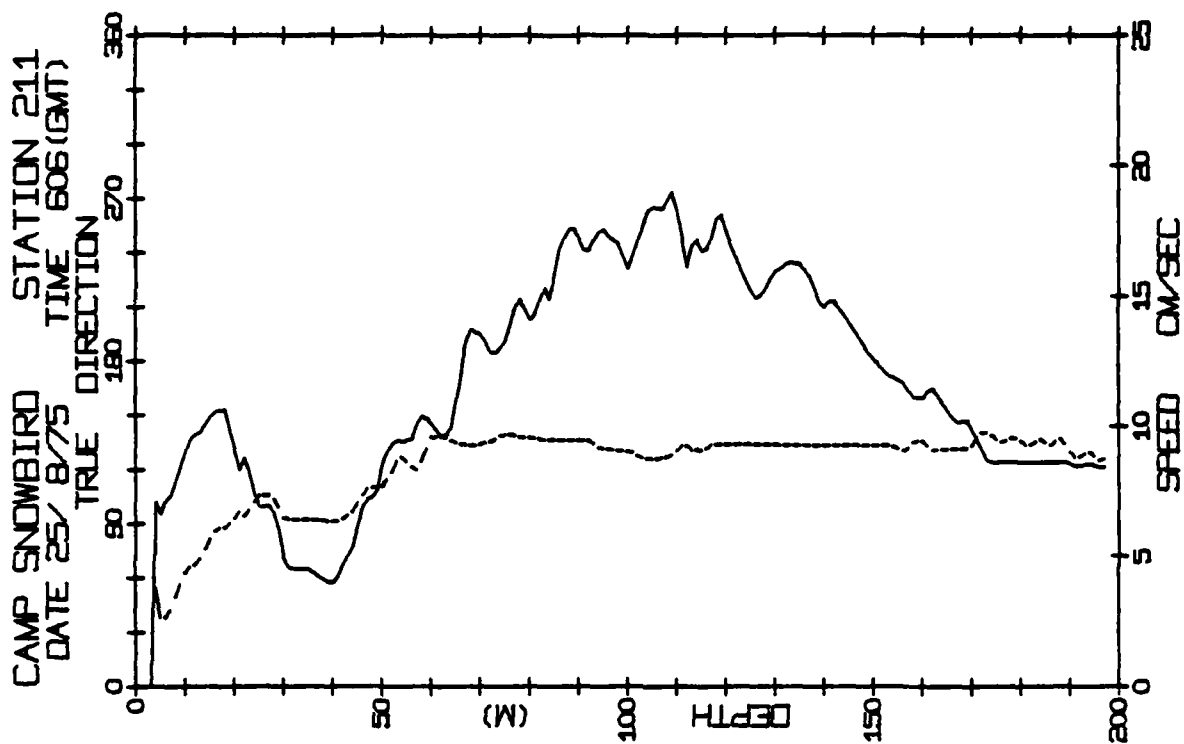


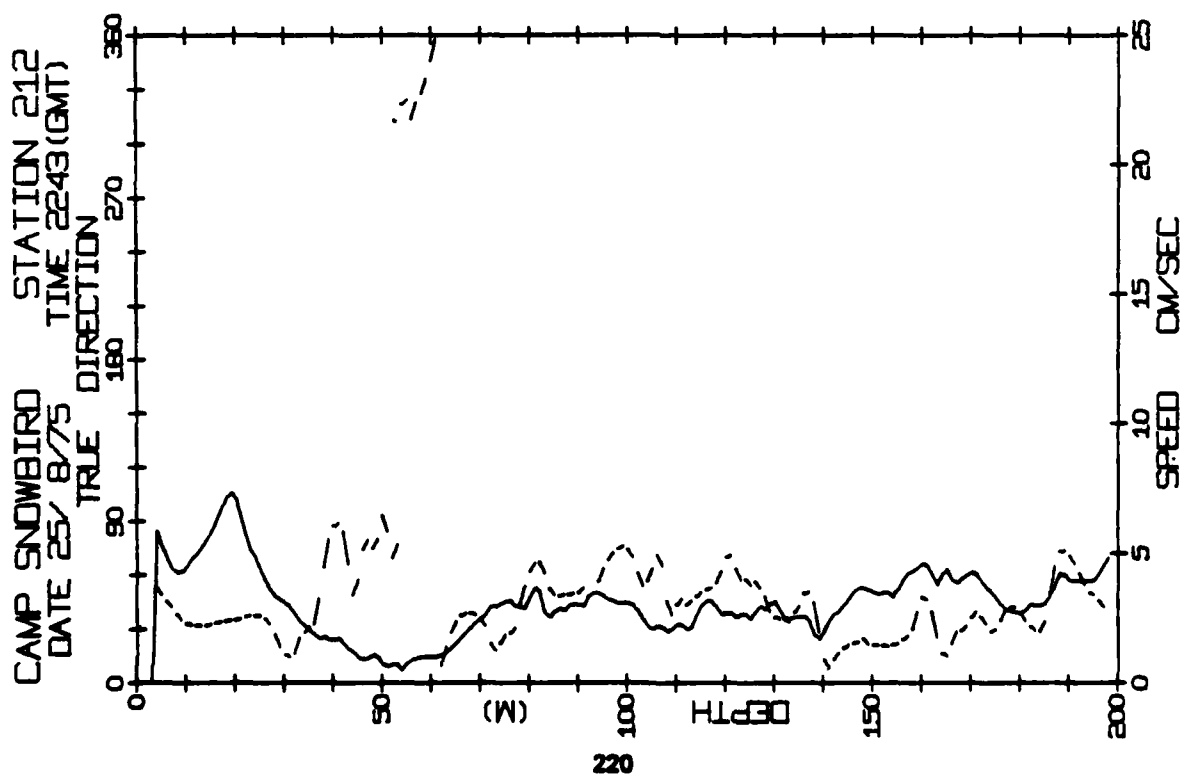
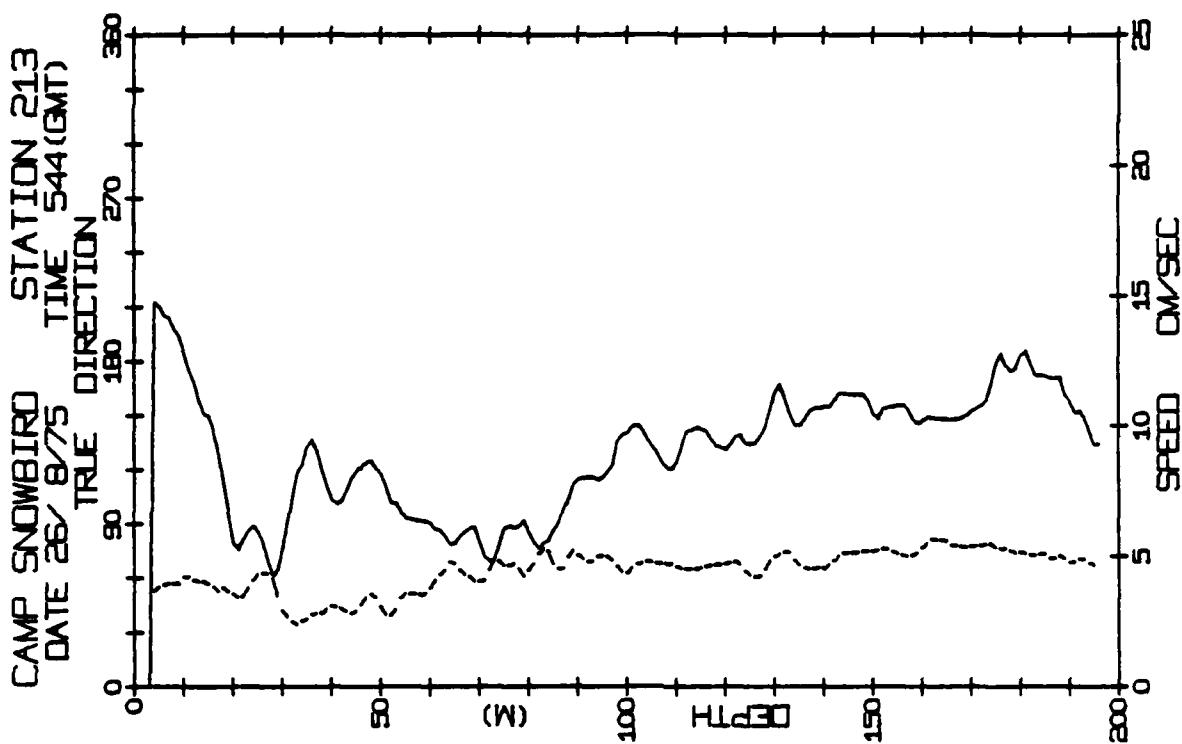
CAMP SNOWBIRD STATION 208
 DATE 24/ 8/75 TIME 1409(GMT)

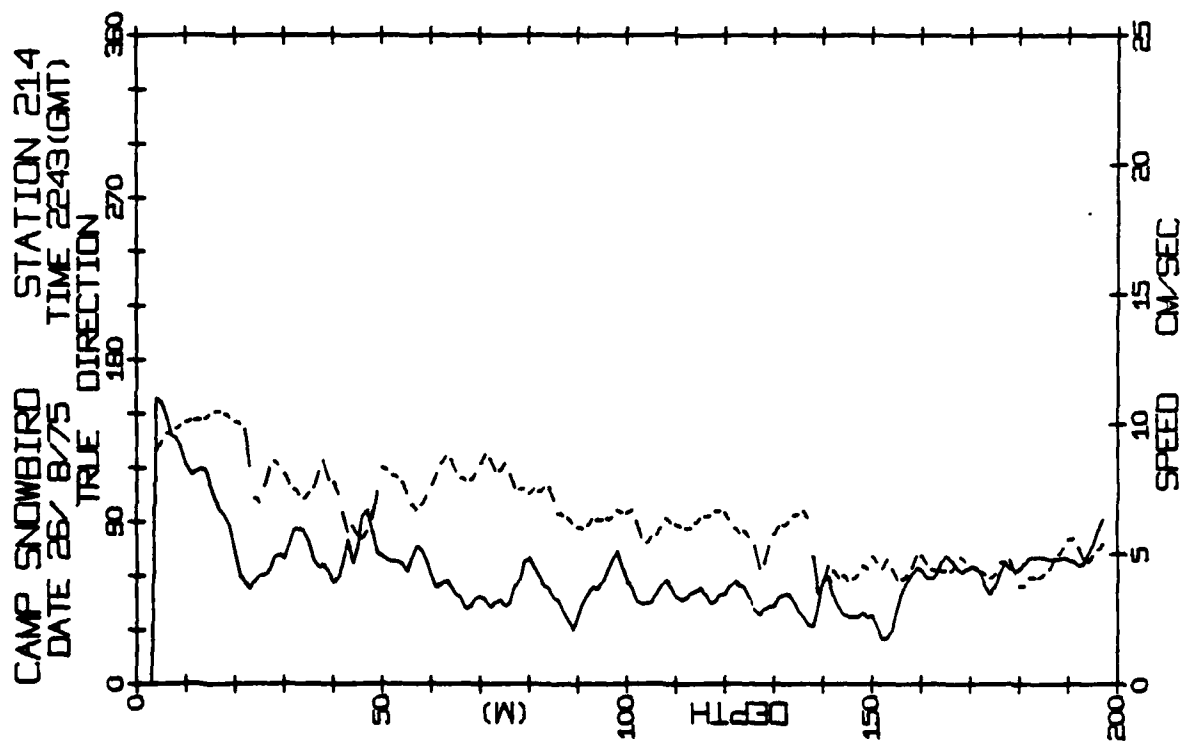
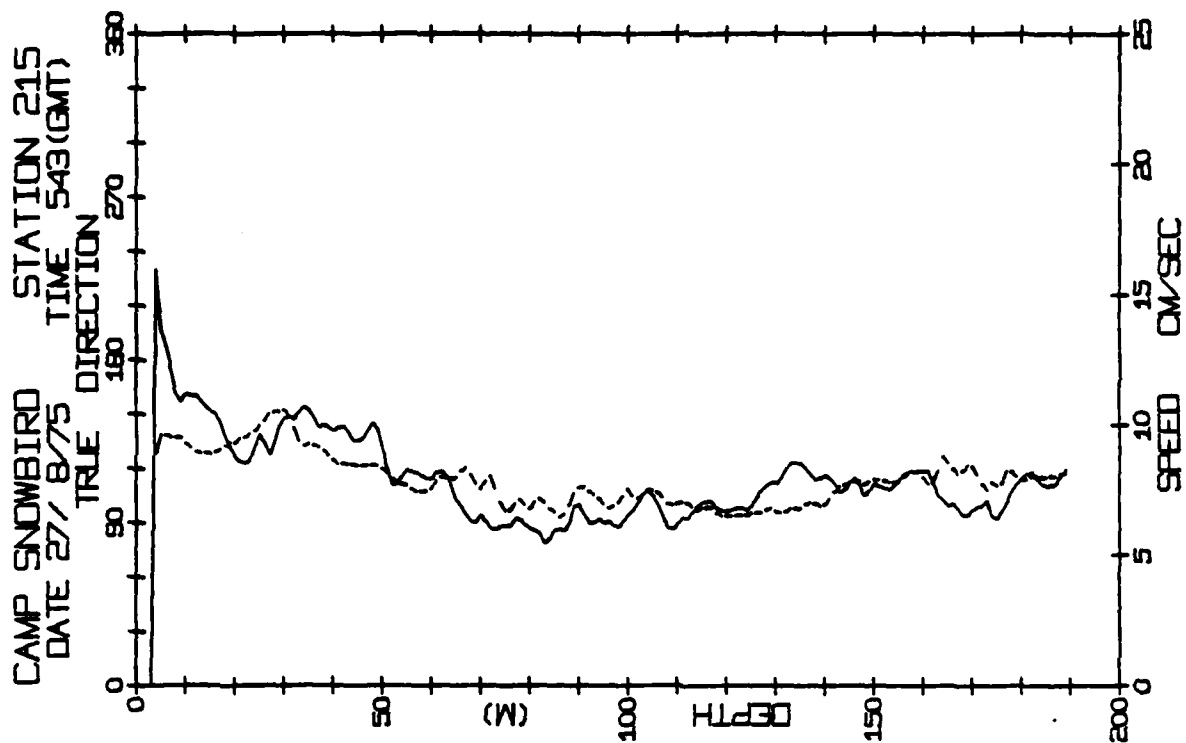


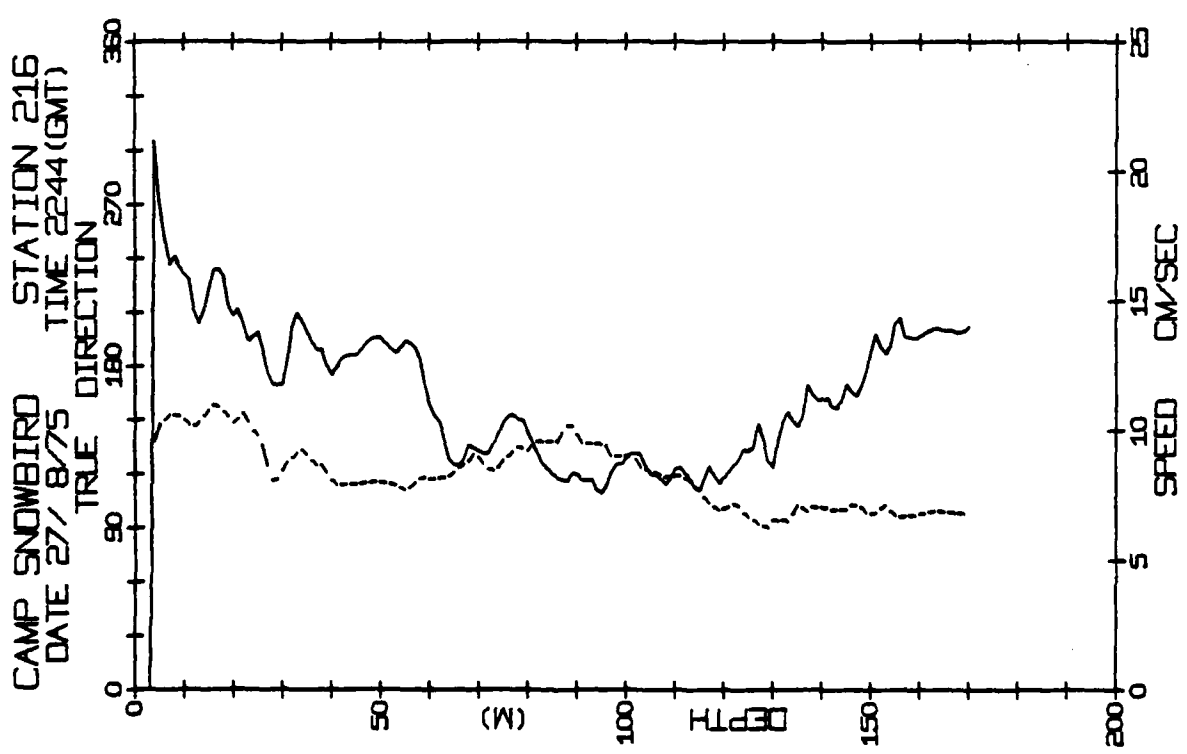
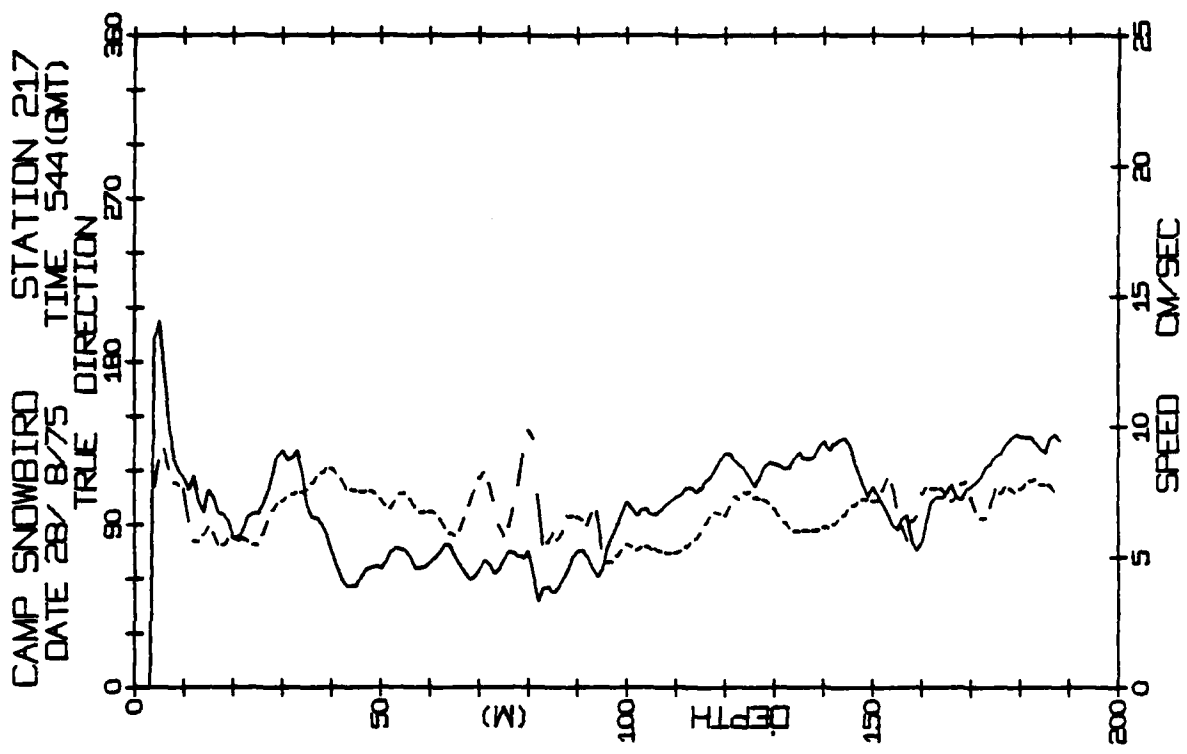
CAMP SNOWBIRD STATION 208
 DATE 24/ 8/75 TIME 543(GMT)

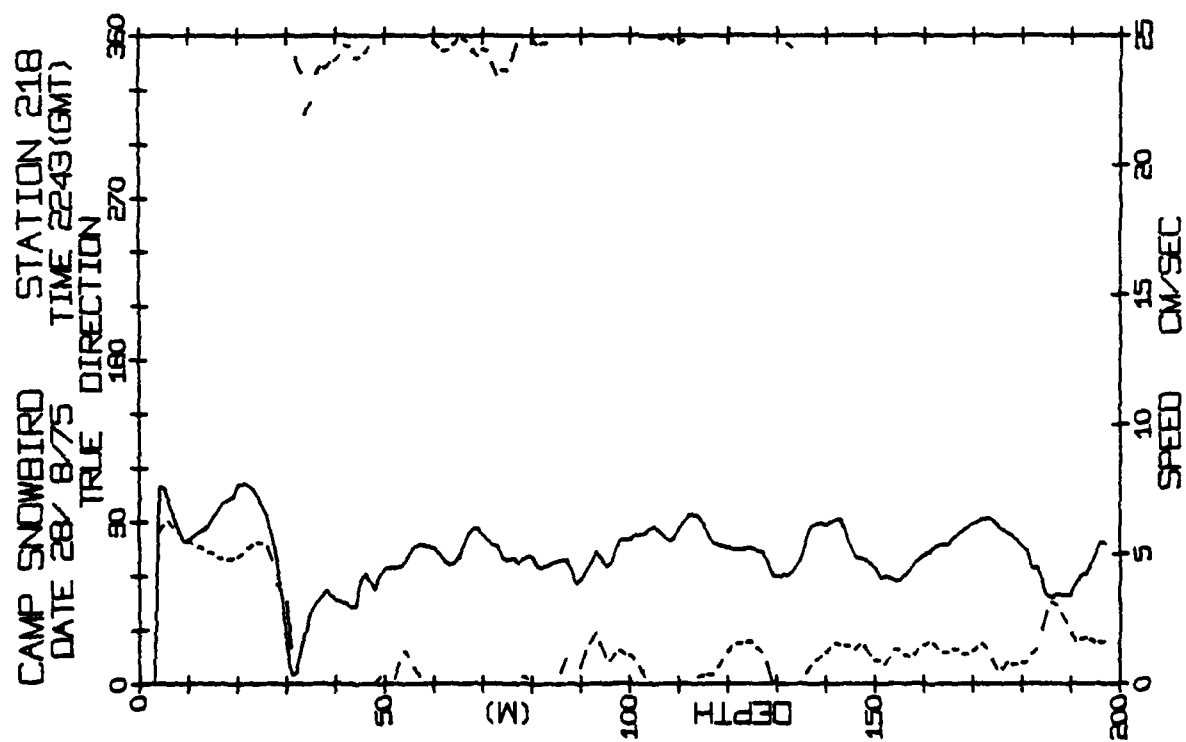
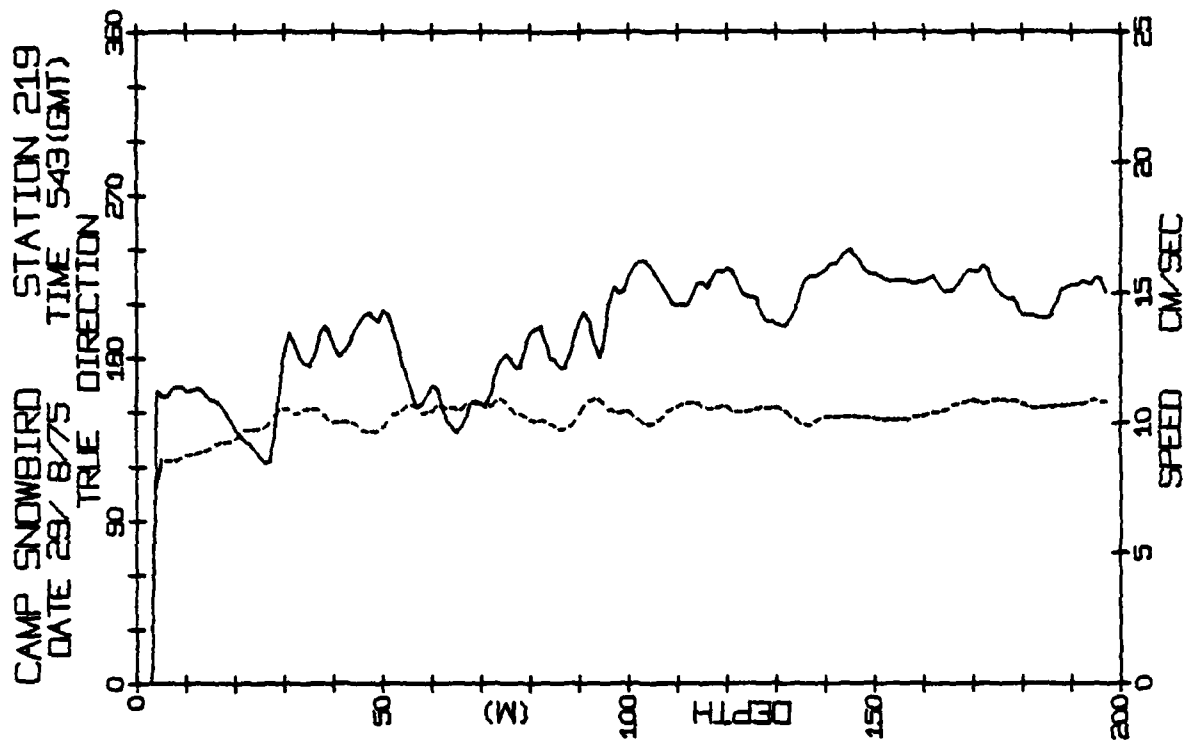


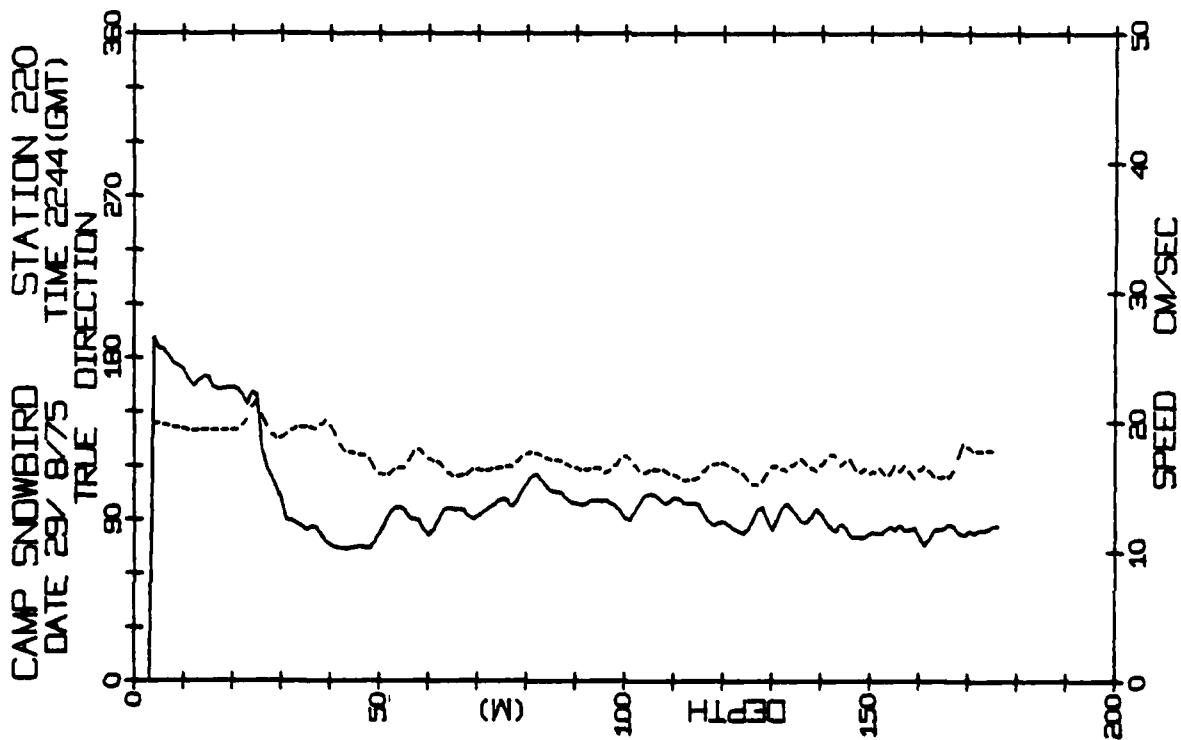
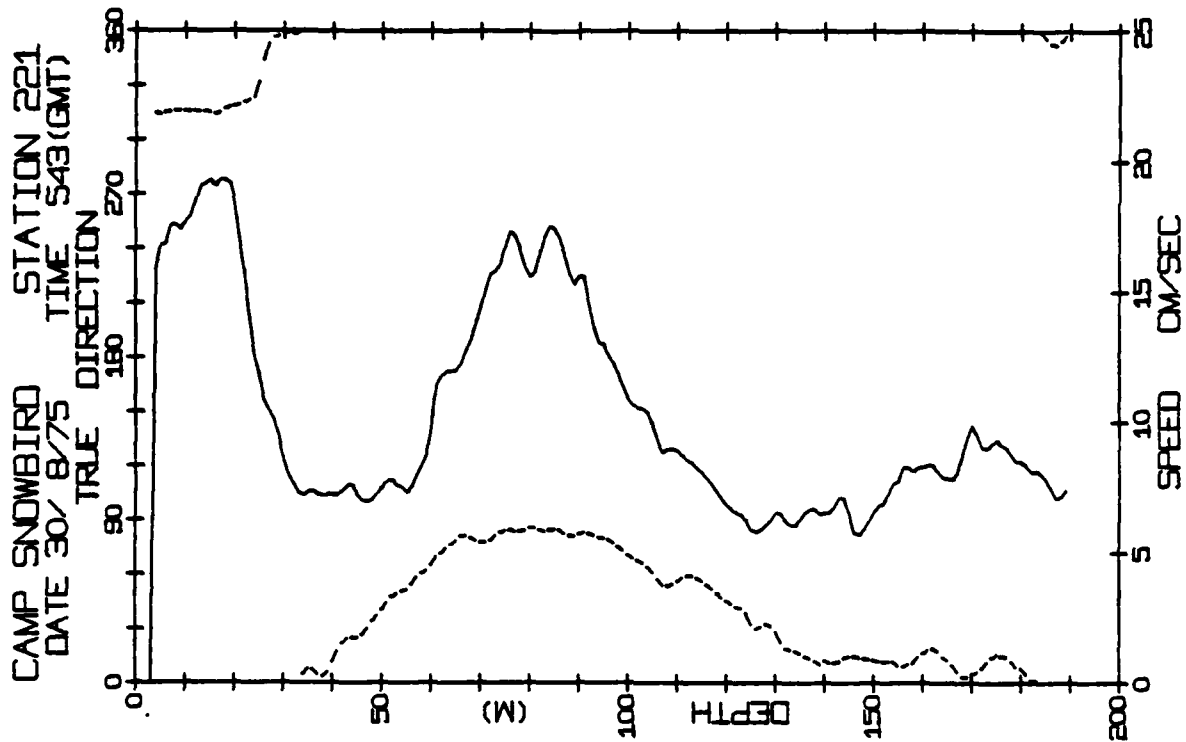




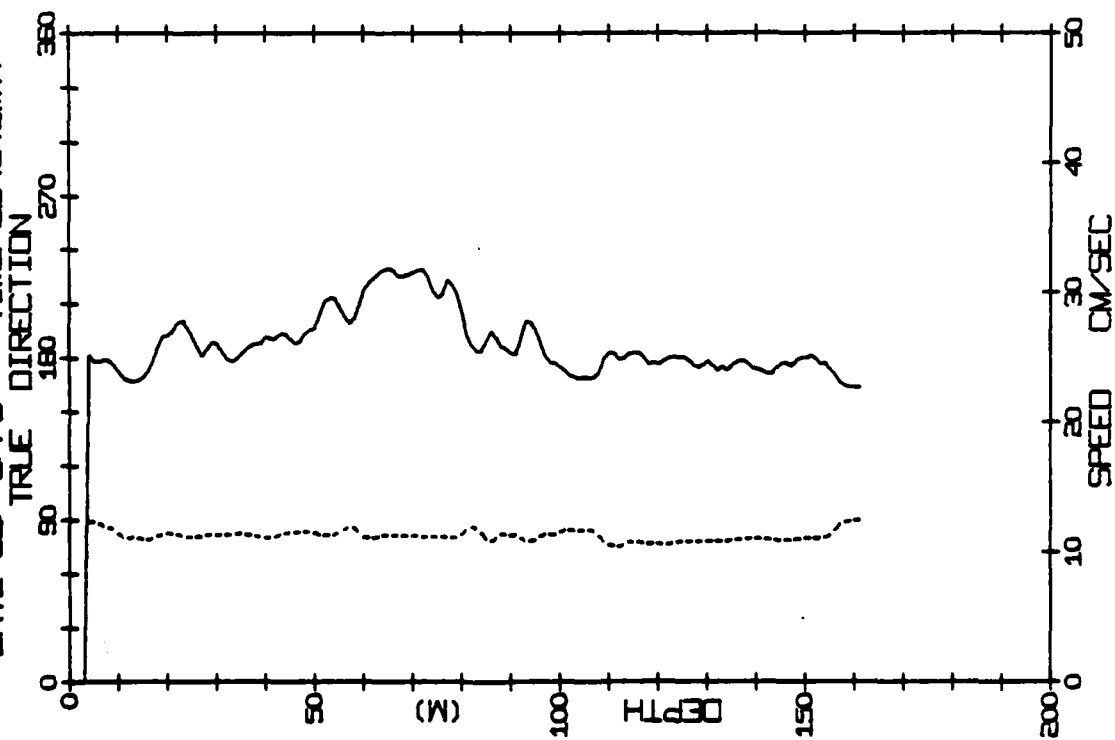




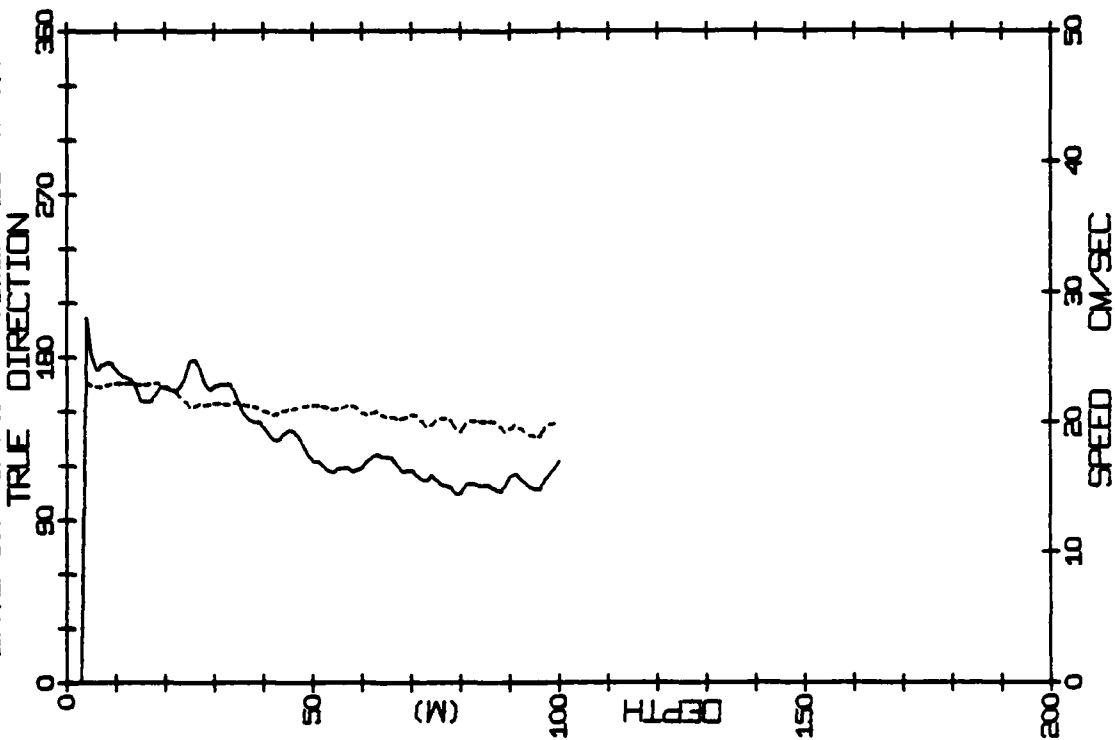


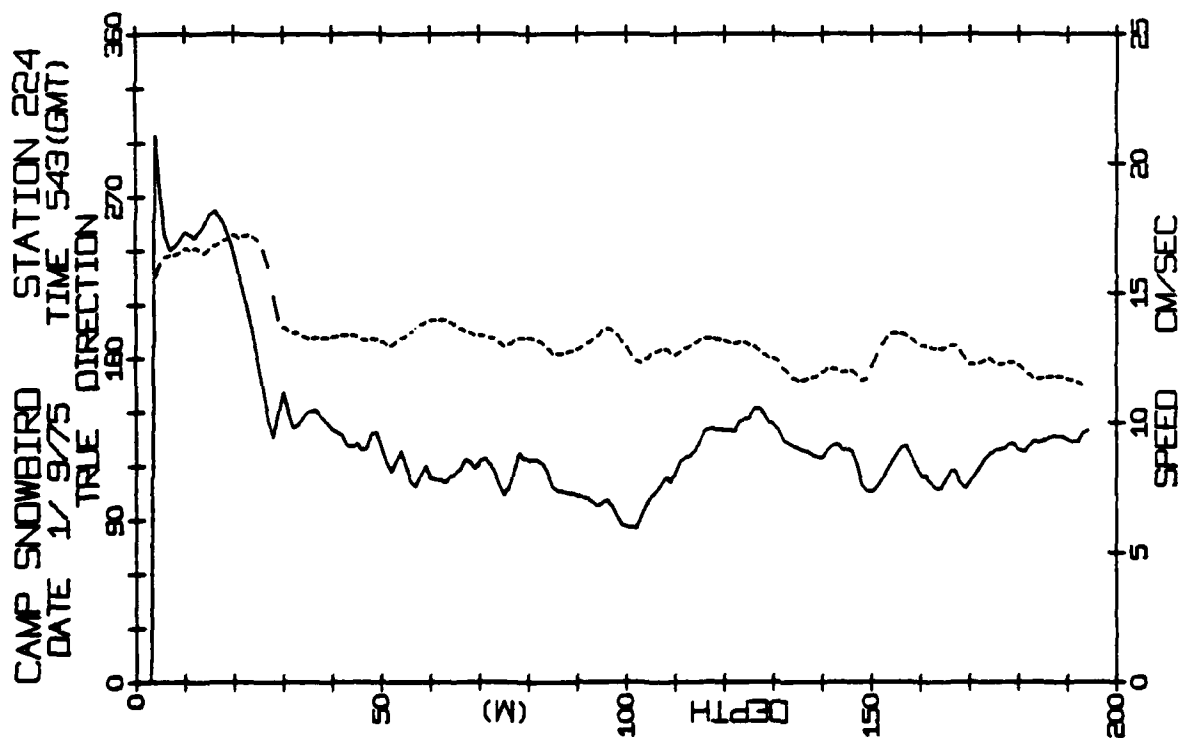
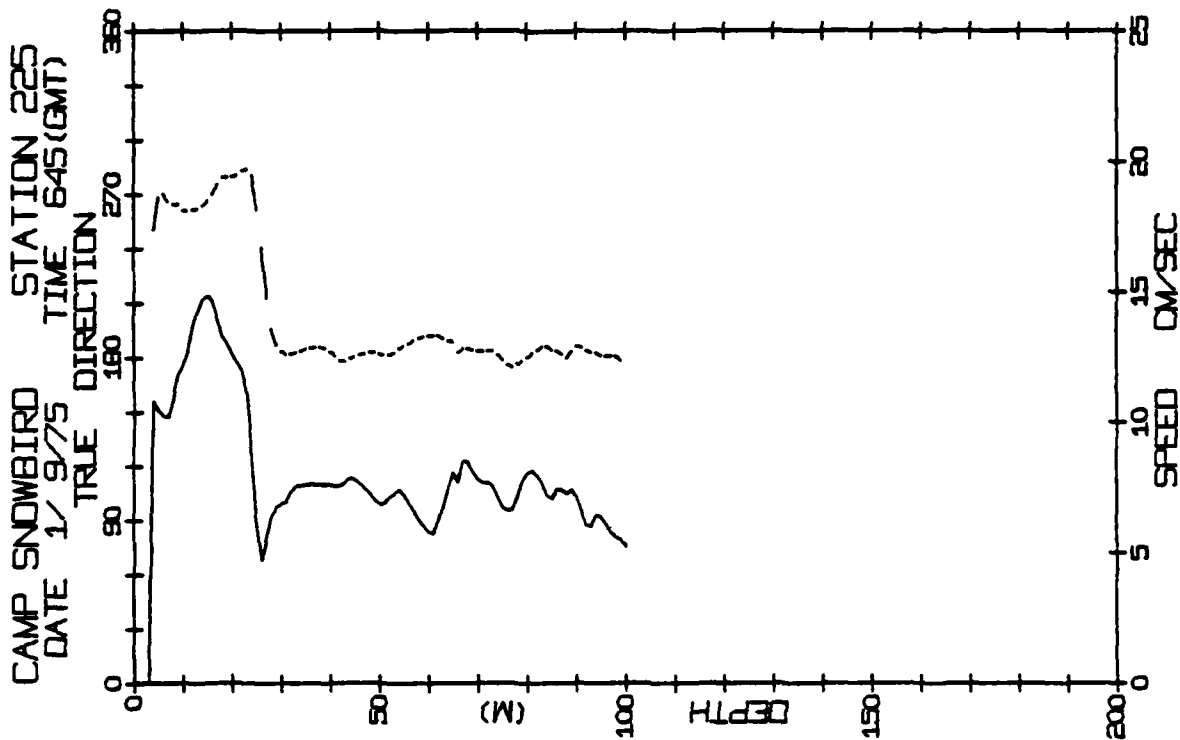


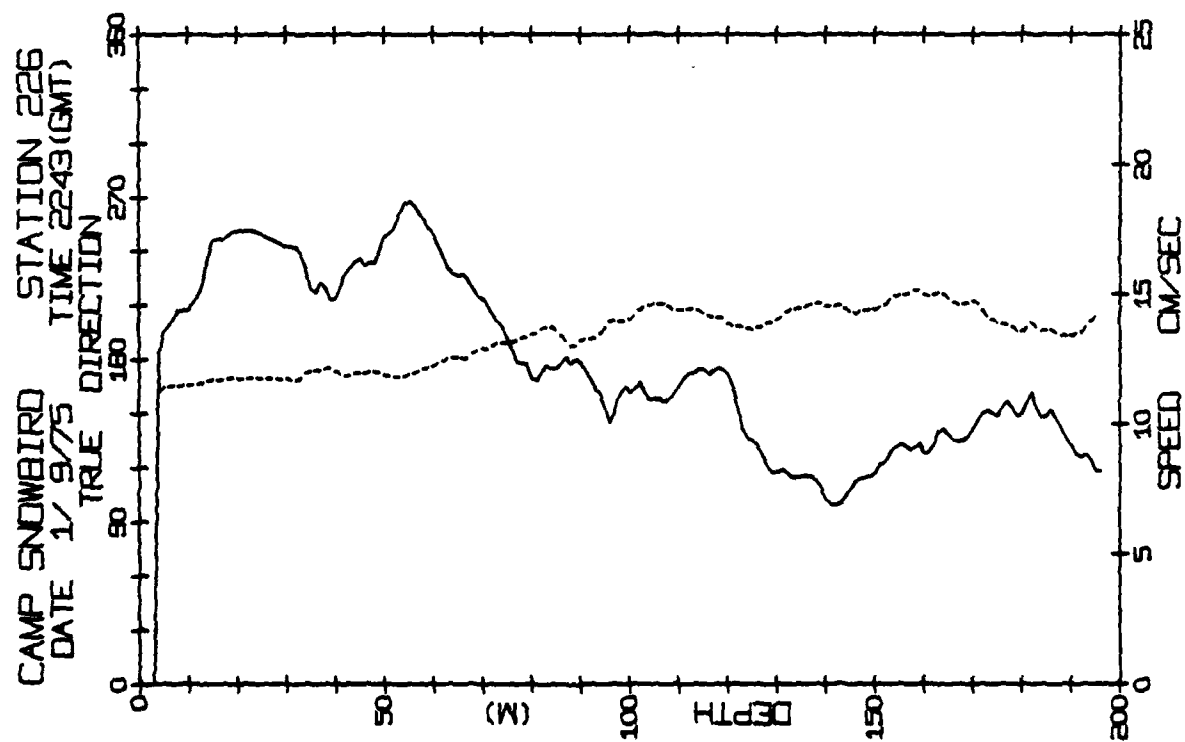
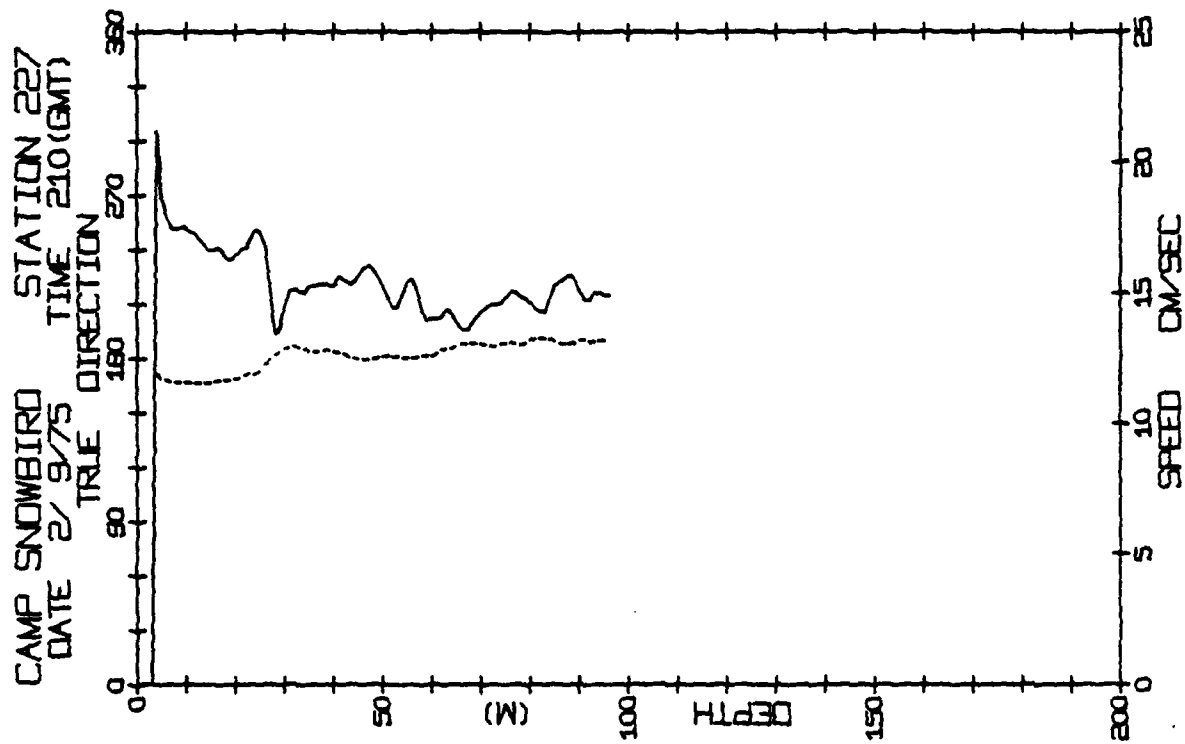
CAMP SNOWBIRD STATION 222
DATE 30/ 8/75 TIME 2243(GMT)



CAMP SNOWBIRD STATION 223
DATE 32/ 8/75 TIME 2116(GMT)



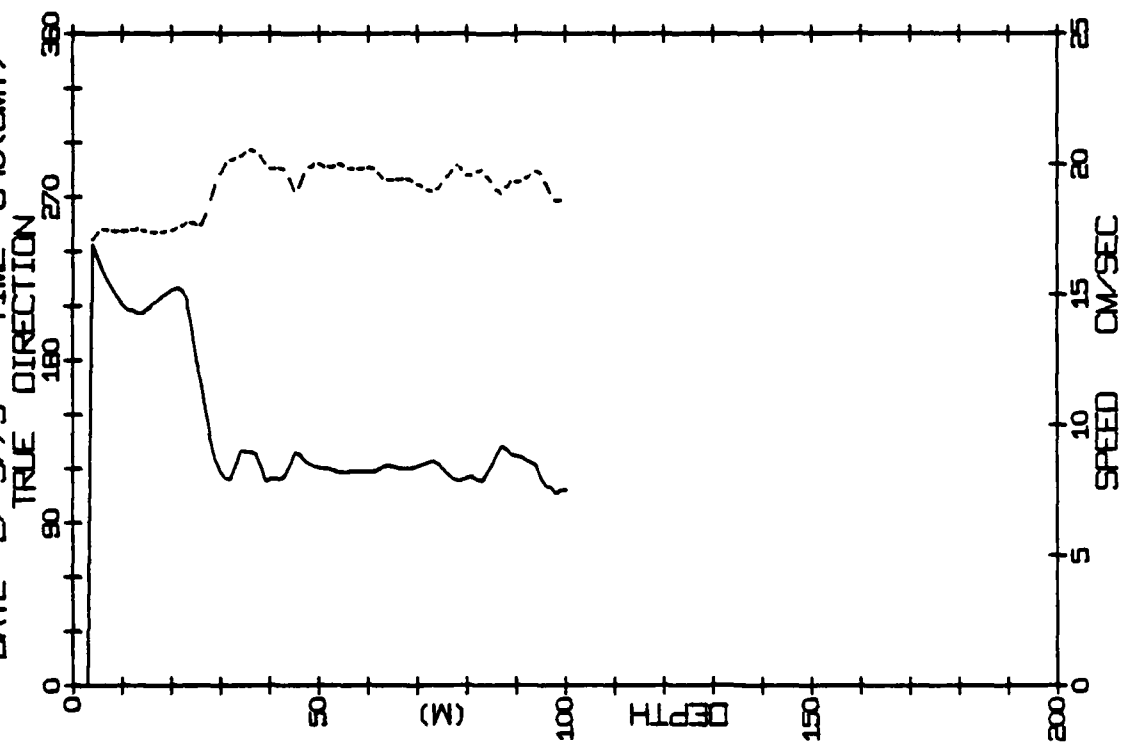




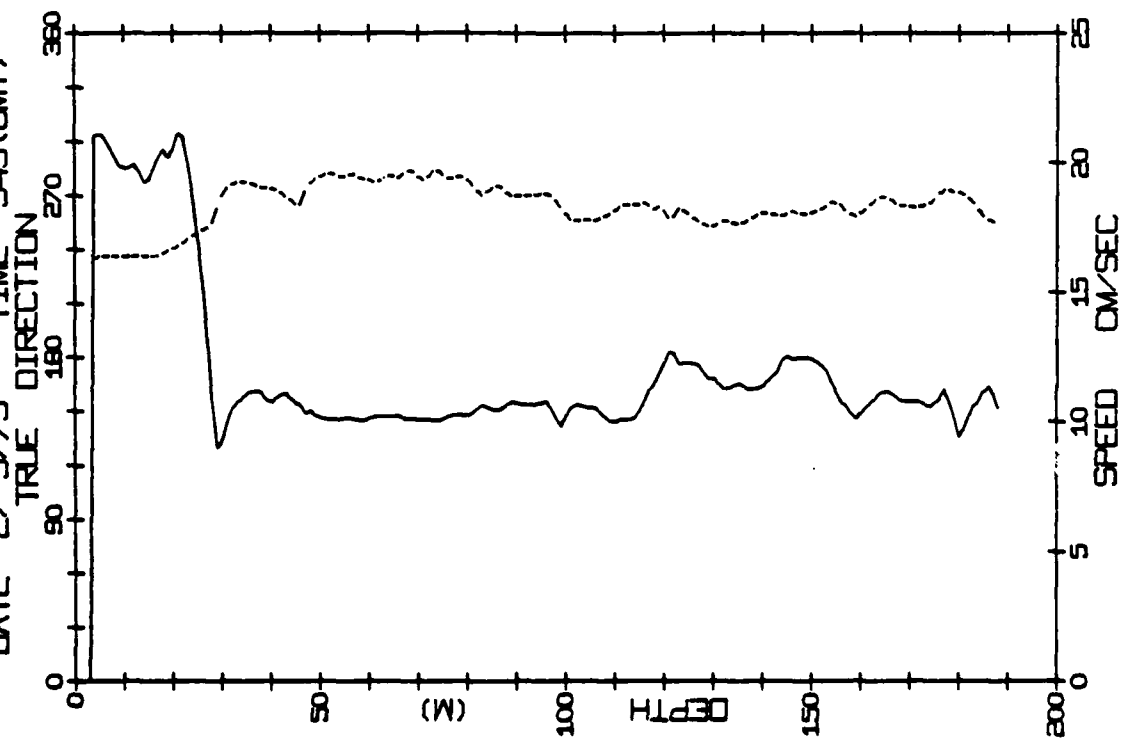
SNOWBIRD STATION 226 (196M.) 2243 GMT
 LAT= 74 5157N LONG= 142 6083W LGER= 290.
 NVEL= -6.9 EVEL= 4.3 NVEN= 5 EVER= 5

[illegible][illegible]

CAMP SNOWBIRD STATION 229
 DATE 2/9/75 TIME 640(GMT)
 TRUE DIRECTION



CAMP SNOWBIRD STATION 228
 DATE 2/9/75 TIME 543(GMT)
 TRUE DIRECTION



SNOWBIRD STATION 229 (100M)
 LAT= 74.4748N LONG= 142.5957W
 NIVEL= -13.5

SNOWBIRD STATION 228 (188M)
 LAT= 74.4784N LONG= 142.5782W
 NIVEL= -14.6

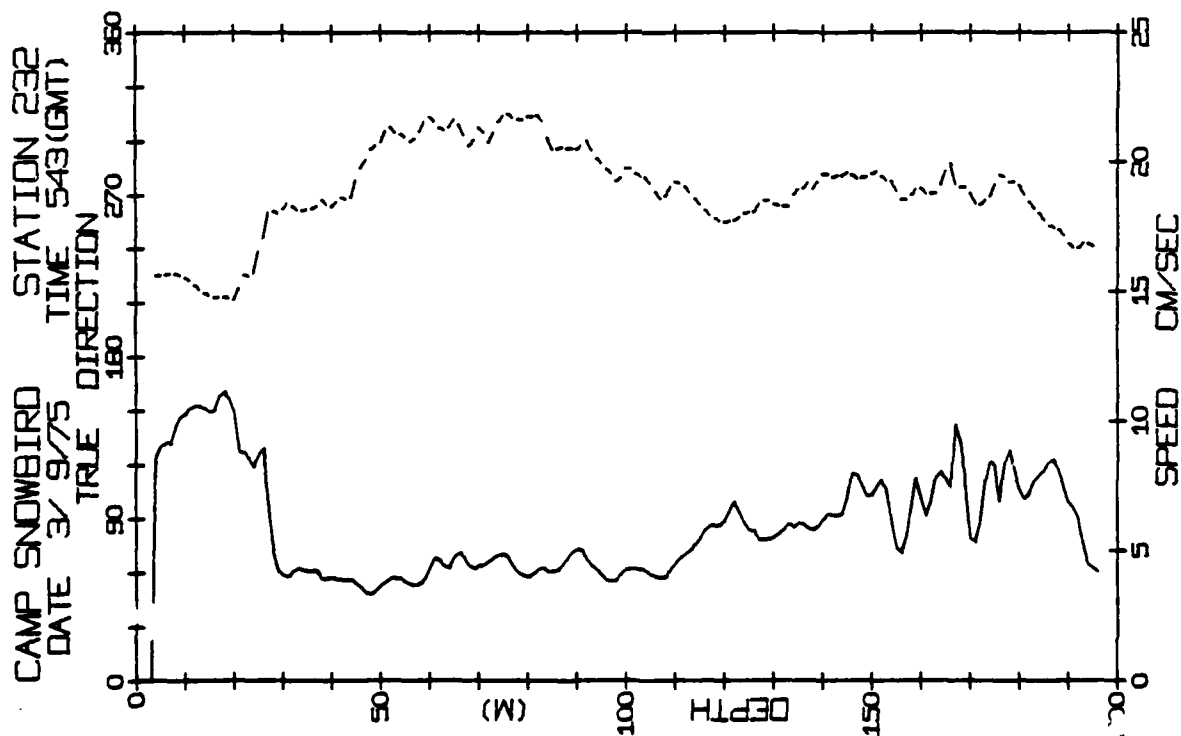
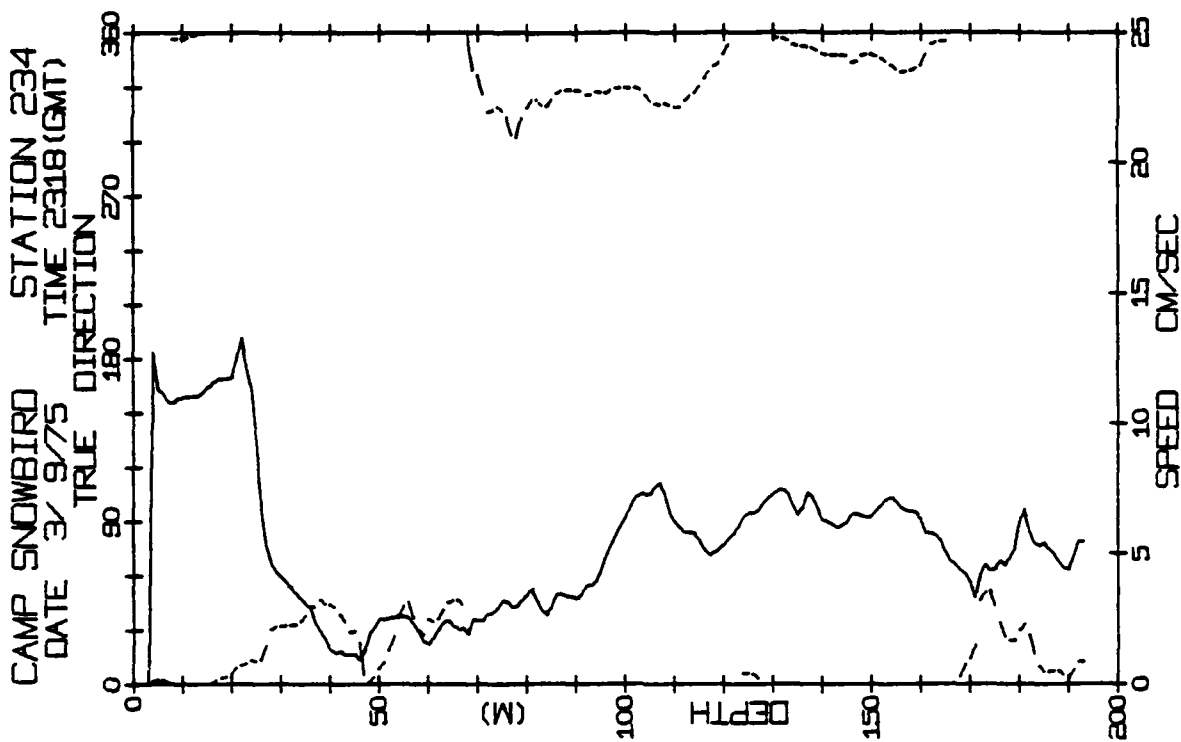
2/SEP/75
 LTER= 0
 NVER= 0

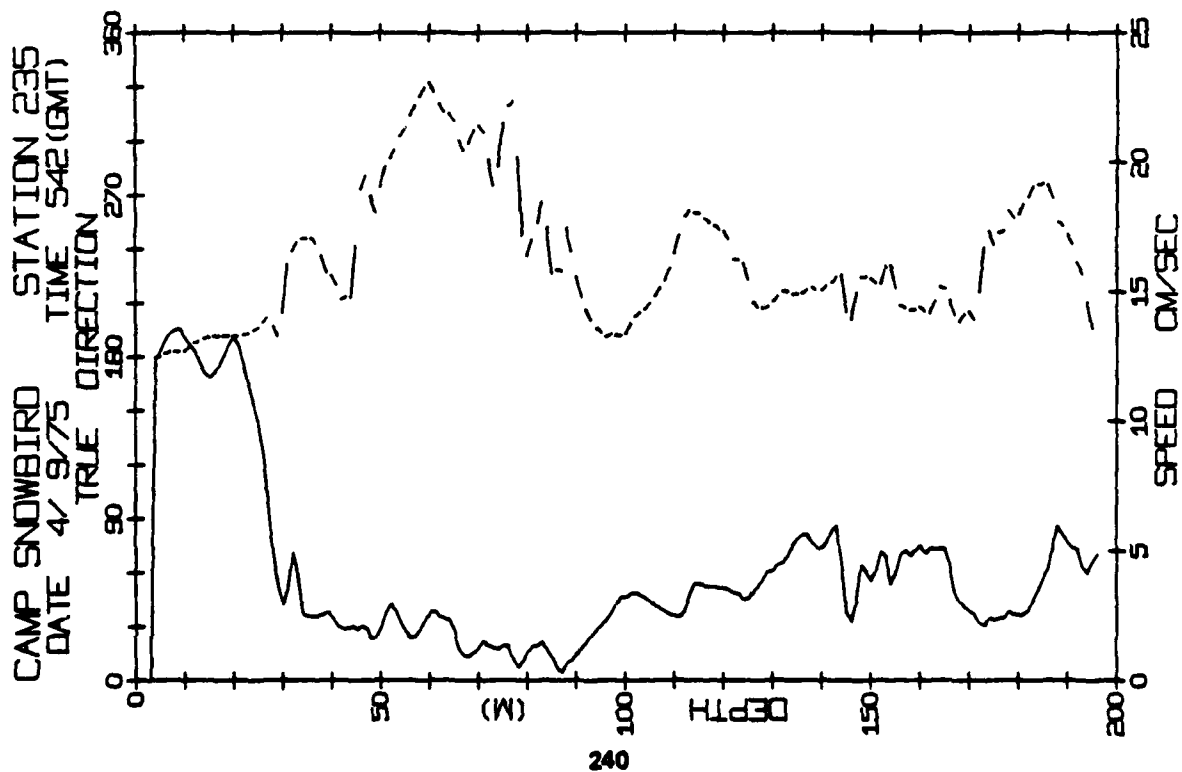
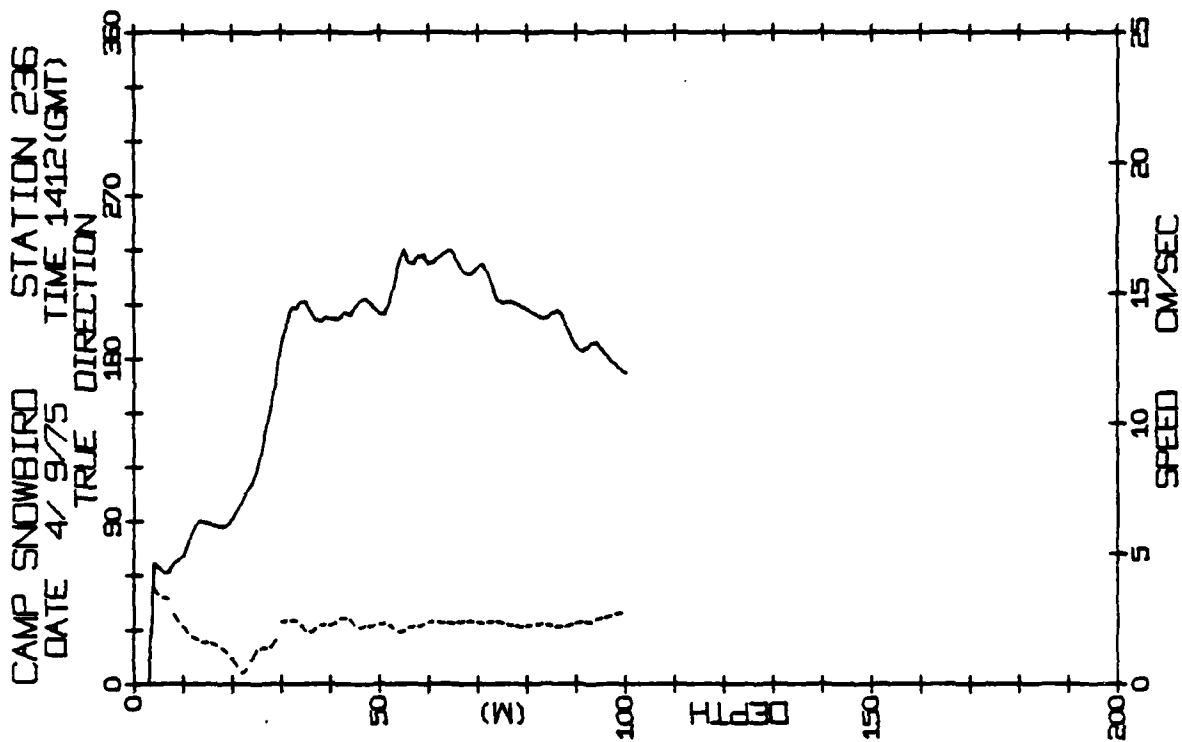
543 GMT
 LGER= 3
 EVER= 0

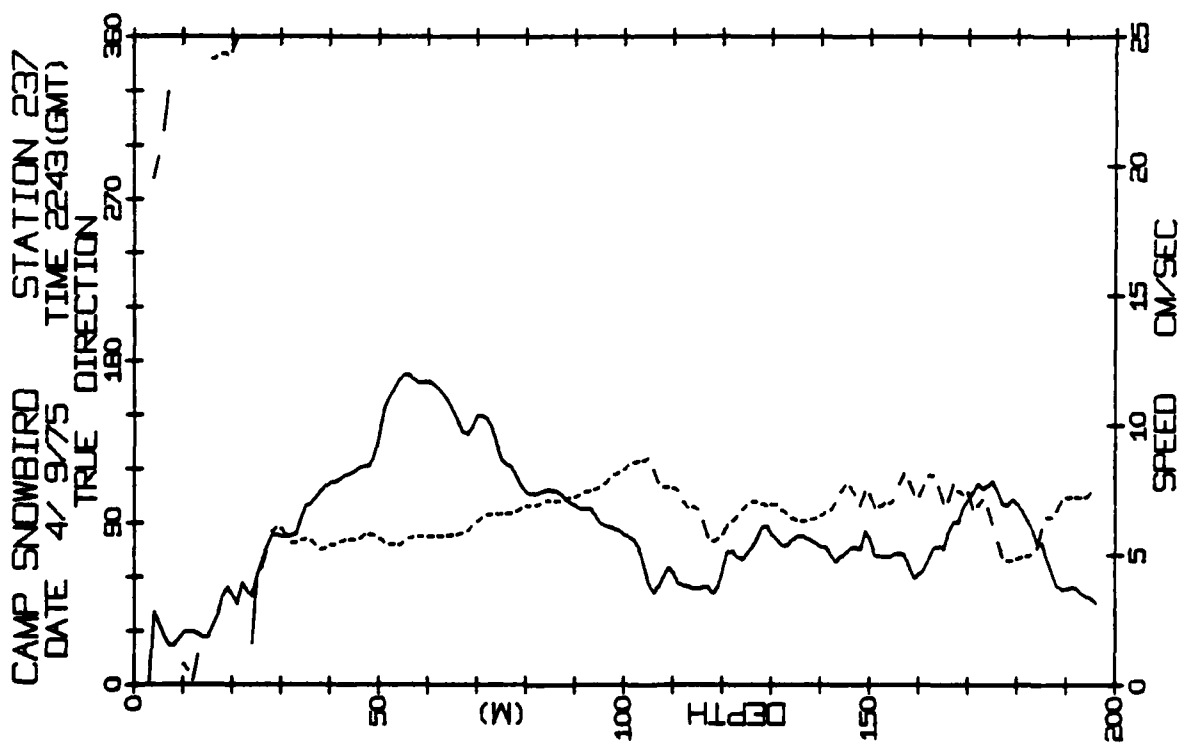
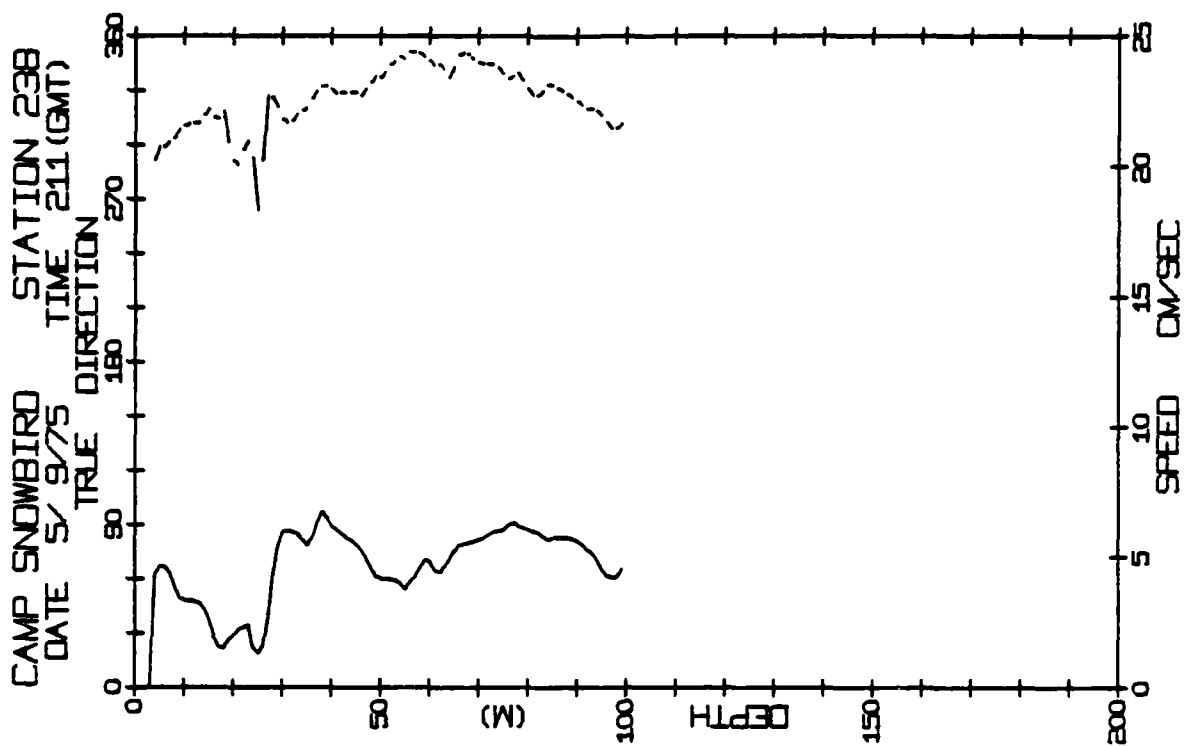
2/SEP/75
 LTER= 0
 NVER= 0

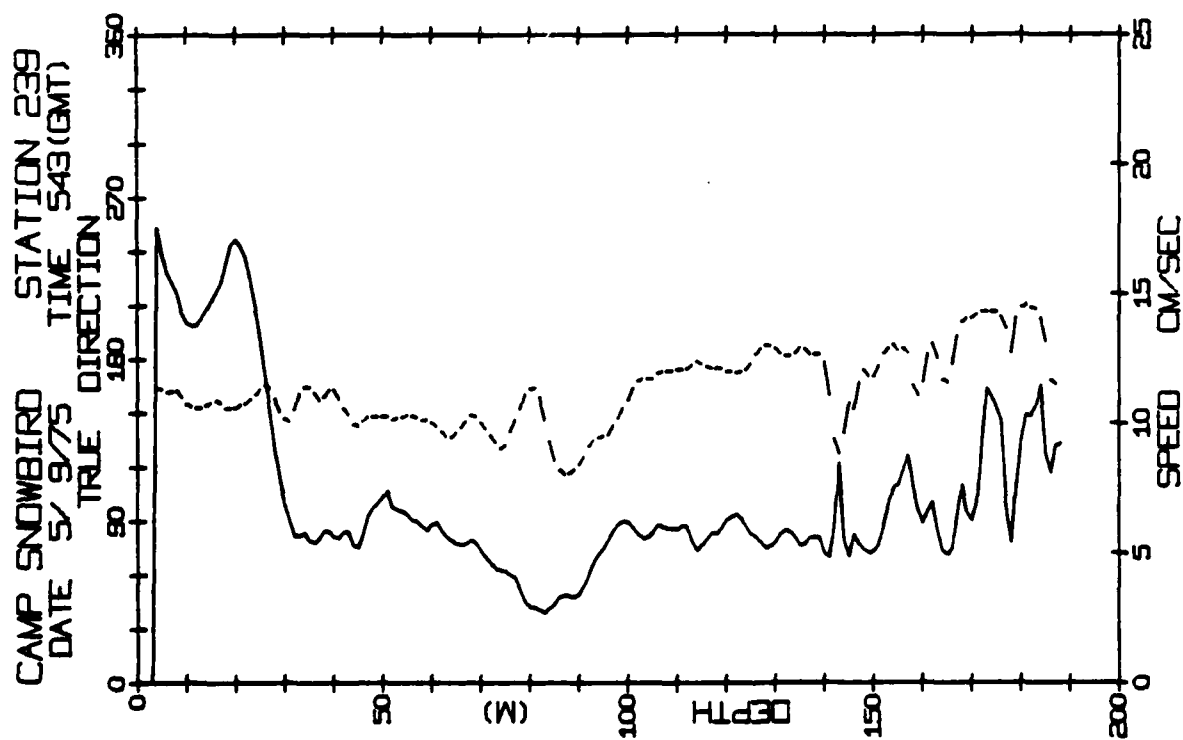
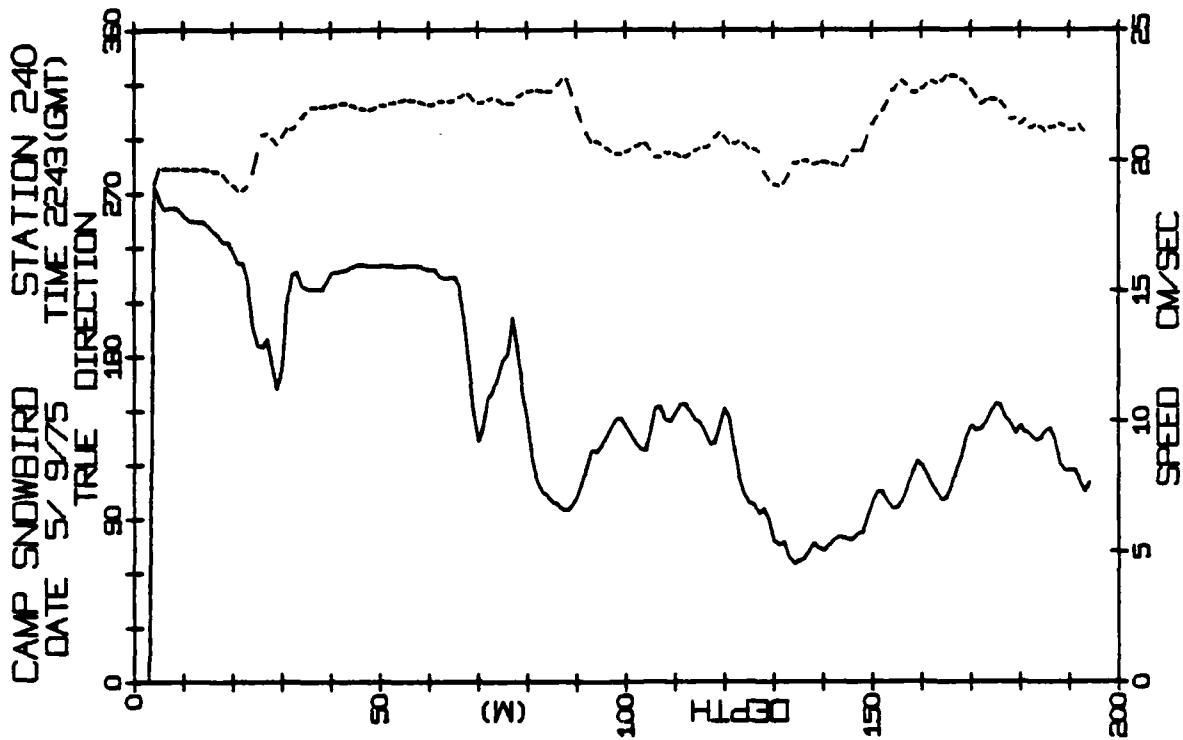
640 GMT
 LGER= 0
 EVER= 0

DPT	SPD	DRN
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
24	24	24
25	25	25
26	26	26
27	27	27
28	28	28
29	29	29
30	30	30
31	31	31
32	32	32
33	33	33
34	34	34
35	35	35
36	36	36
37	37	37
38	38	38
39	39	39
40	40	40
41	41	41
42	42	42
43	43	43
44	44	44
45	45	45
46	46	46
47	47	47
48	48	48
49	49	49
50	50	50
51	51	51
52	52	52
53	53	53
54	54	54
55	55	55
56	56	56
57	57	57
58	58	58
59	59	59
60	60	60
61	61	61
62	62	62
63	63	63
64	64	64
65	65	65
66	66	66
67	67	67
68	68	68
69	69	69
70	70	70
71	71	71
72	72	72
73	73	73
74	74	74
75	75	75
76	76	76
77	77	77
78	78	78
79	79	79
80	80	80
81	81	81
82	82	82
83	83	83
84	84	84
85	85	85
86	86	86
87	87	87
88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

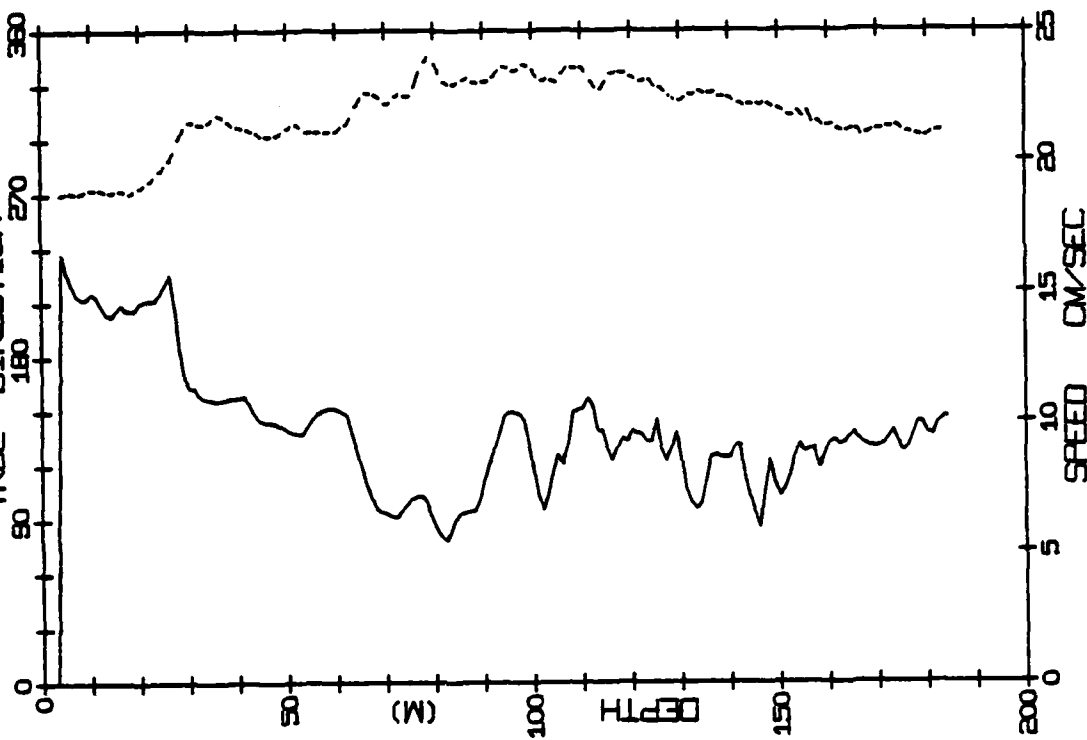




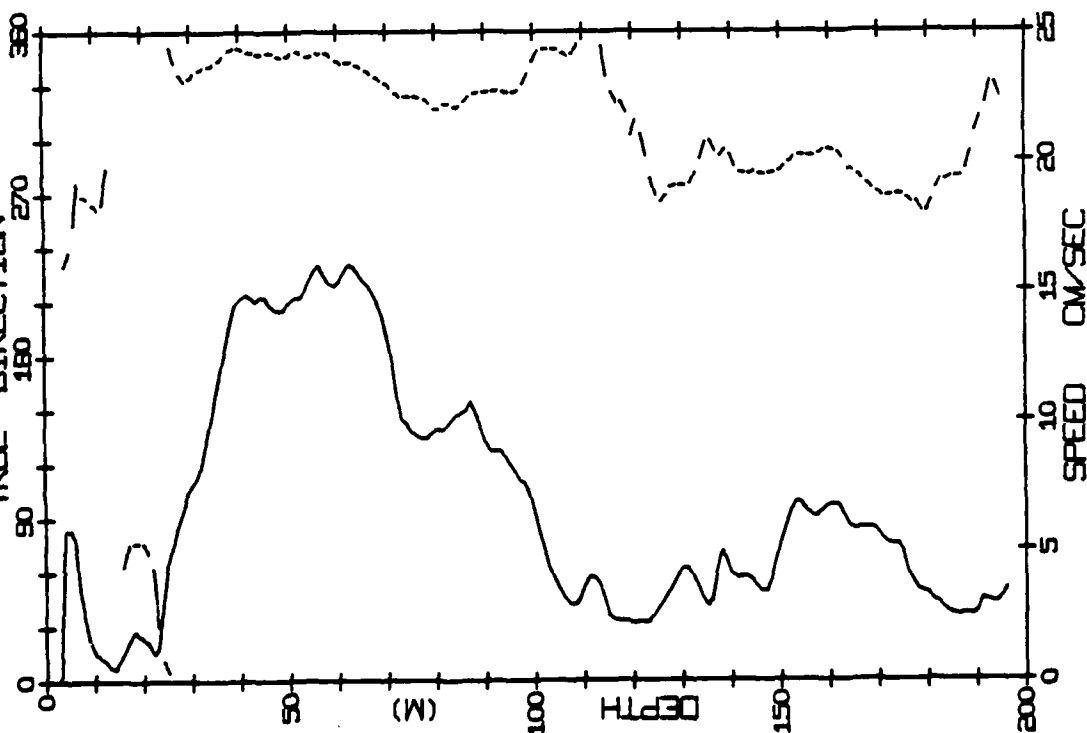


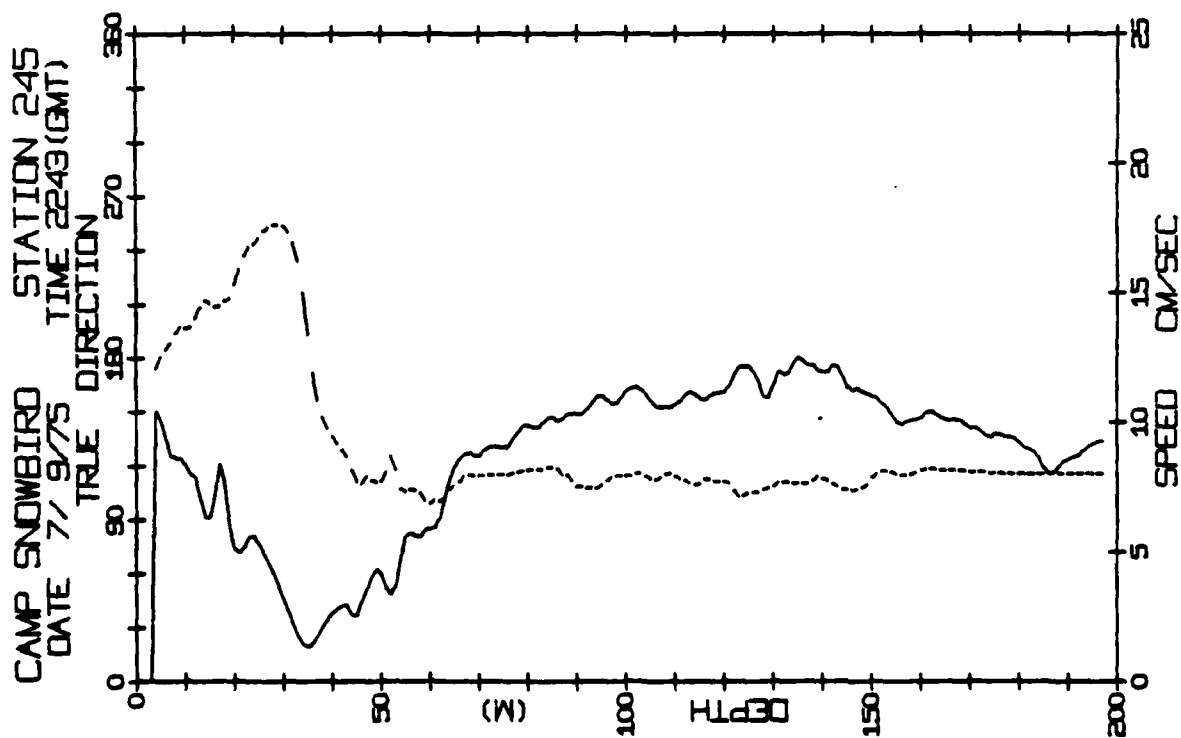
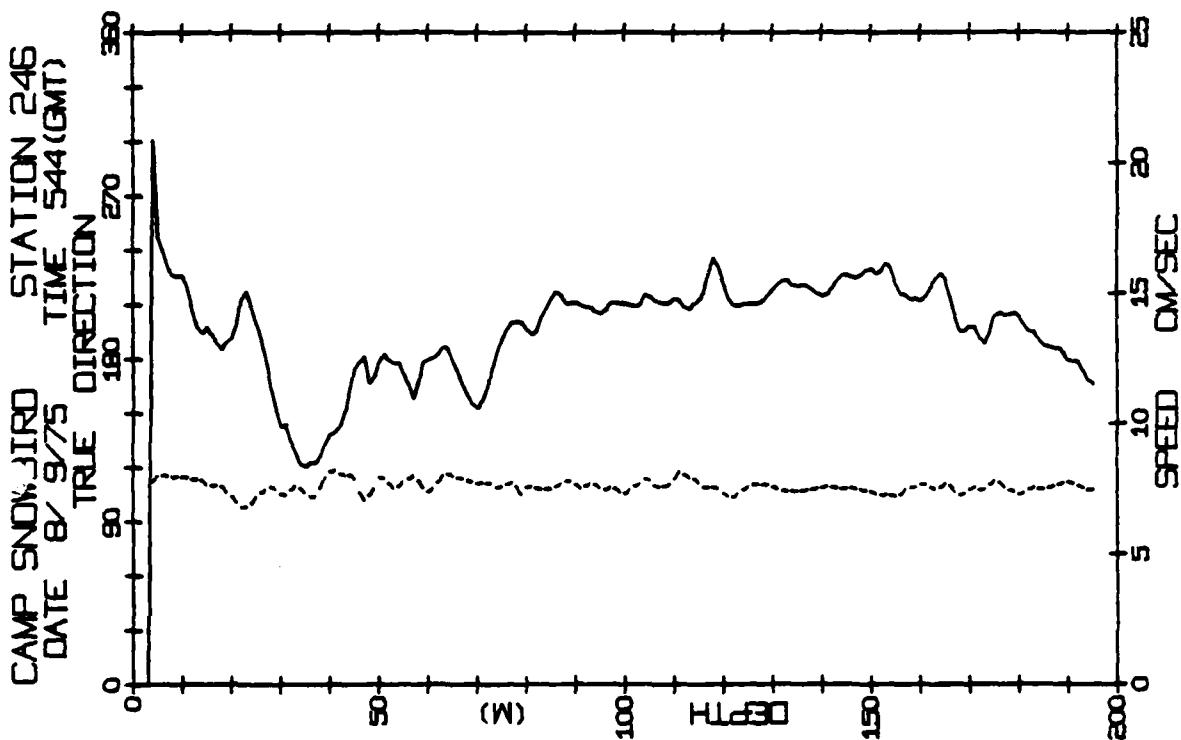


CAMP SNOWBIRD STATION 243
 DATE 6/9/75 TIME 2243(GMT)
 TRUE DIRECTION

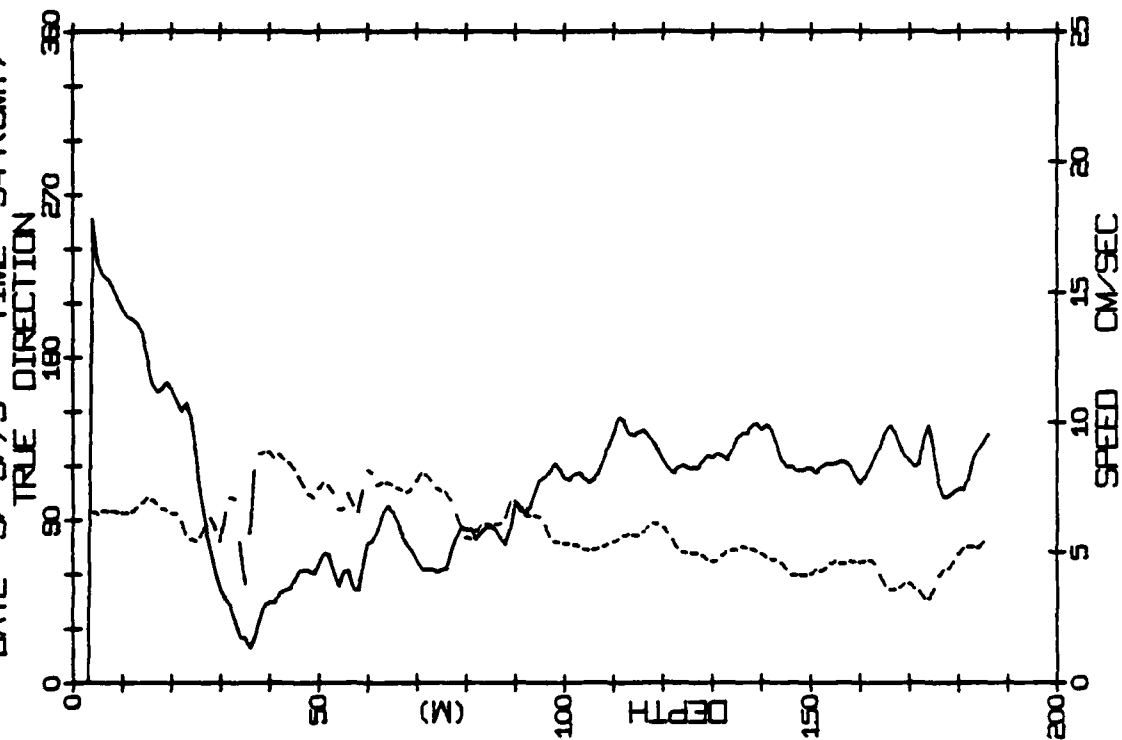


CAMP SNOWBIRD STATION 241
 DATE 6/9/75 TIME 544(GMT)
 TRUE DIRECTION

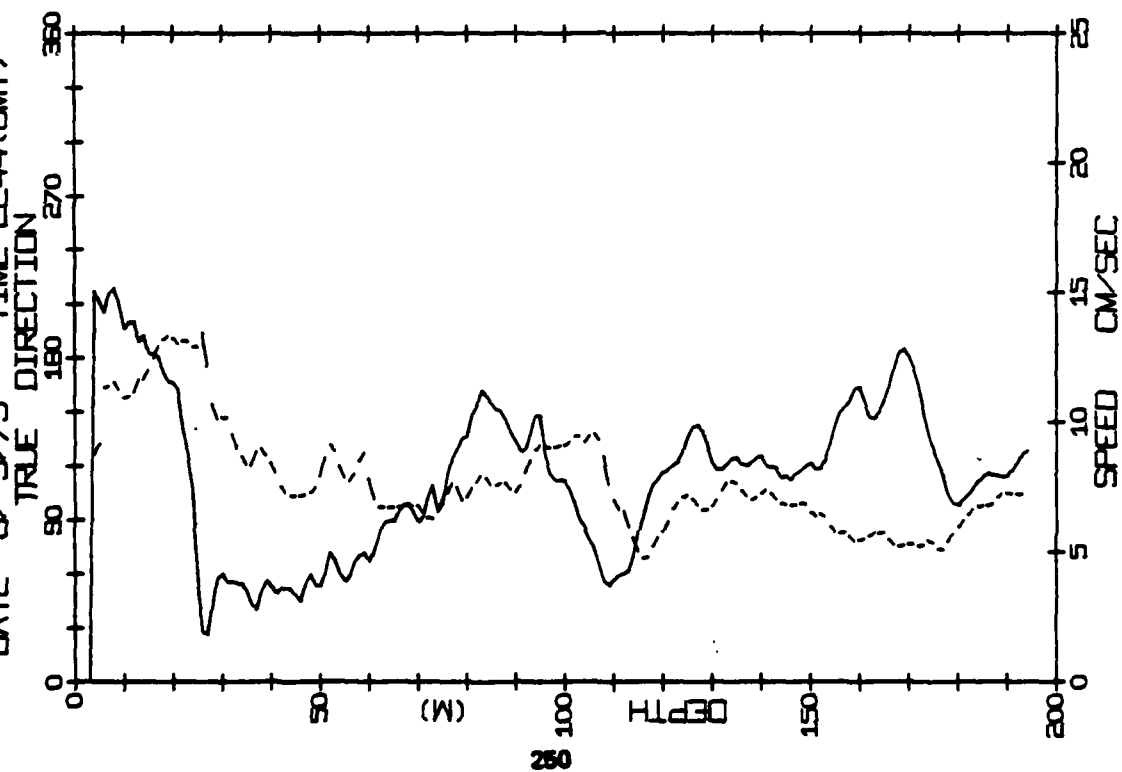


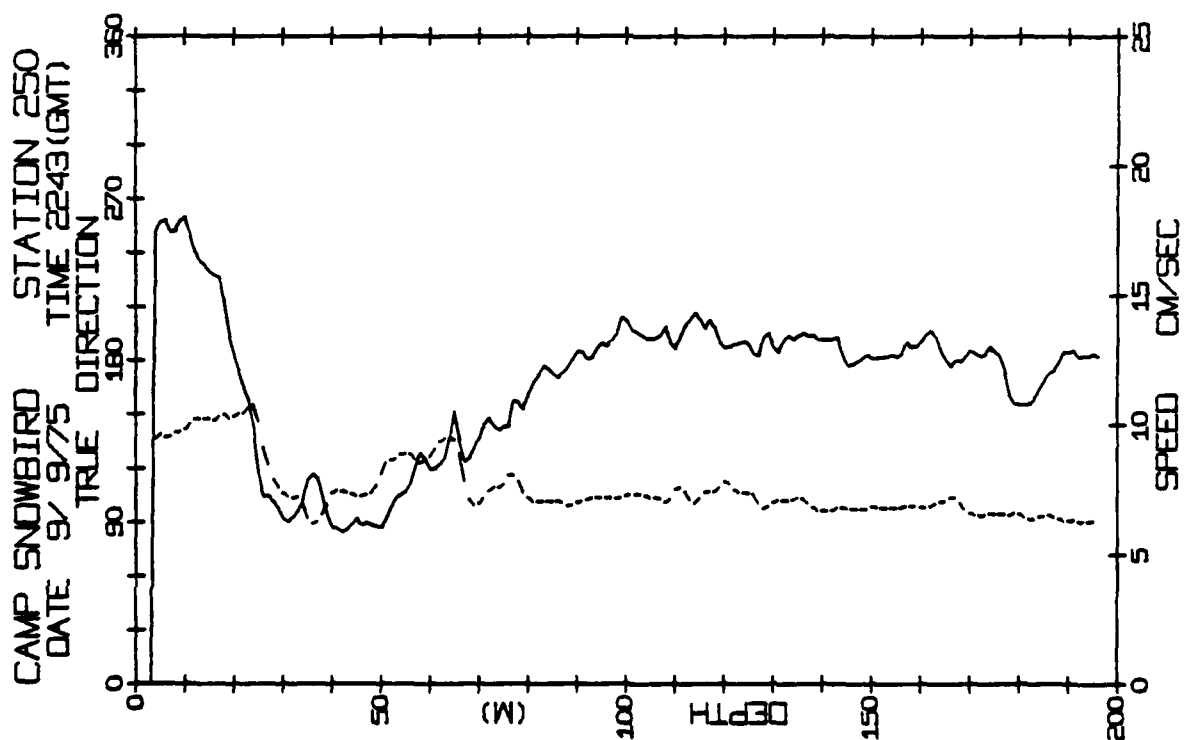
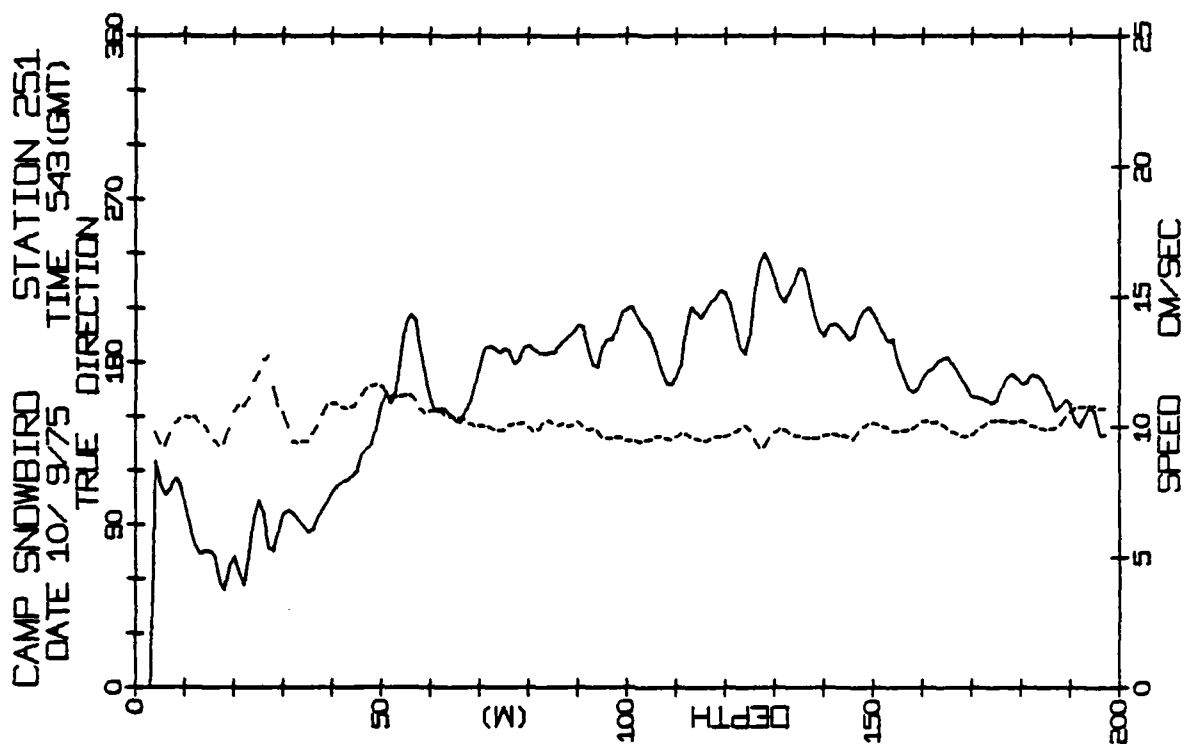


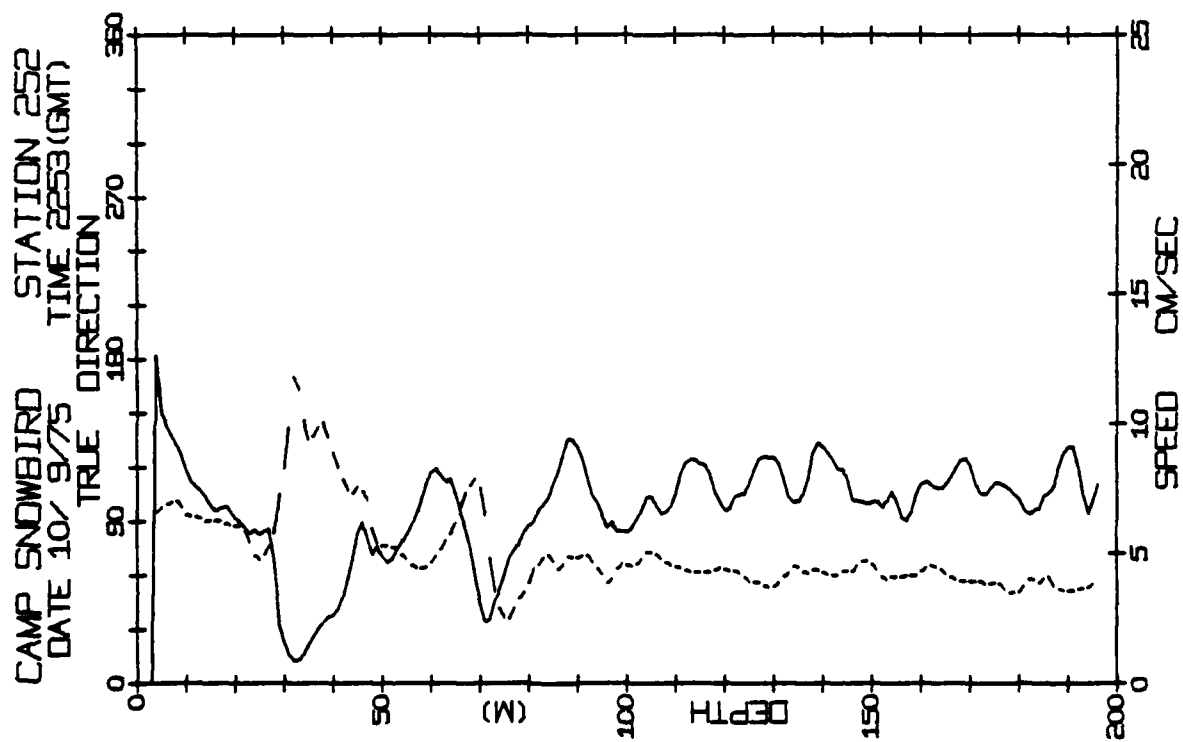
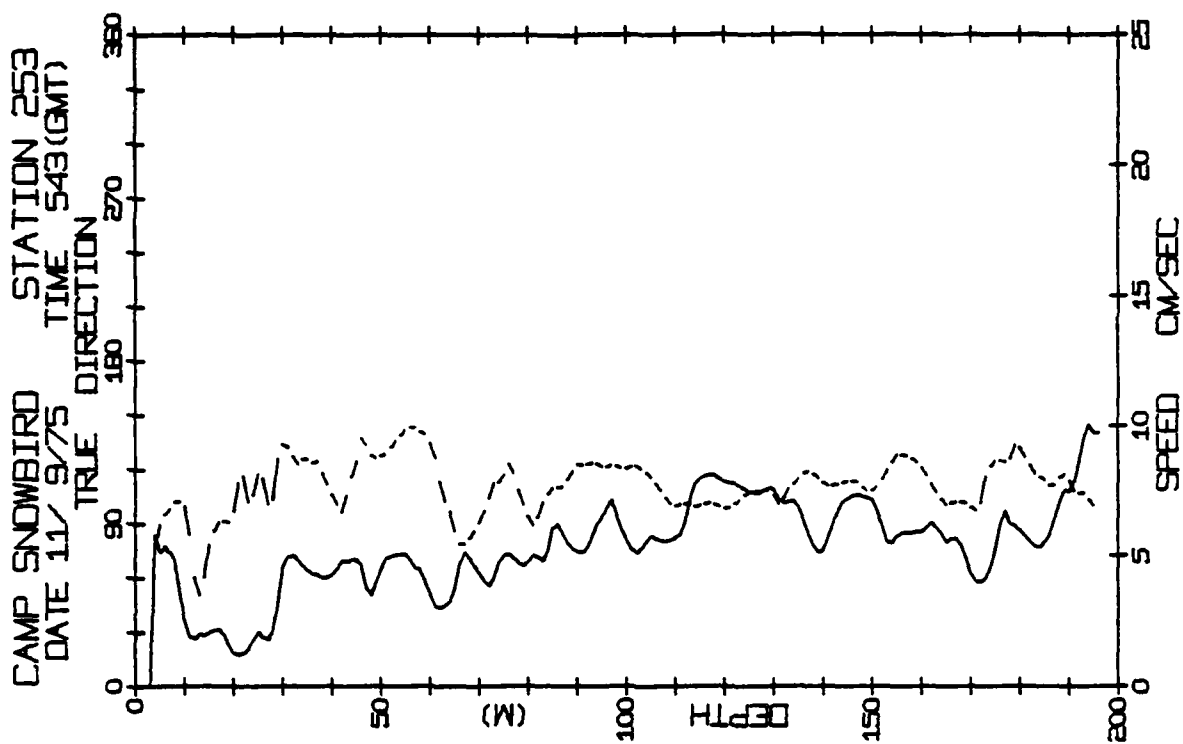
CAMP SNOWBIRD STATION 248
 DATE 8/9/75 TIME 544(GMT)

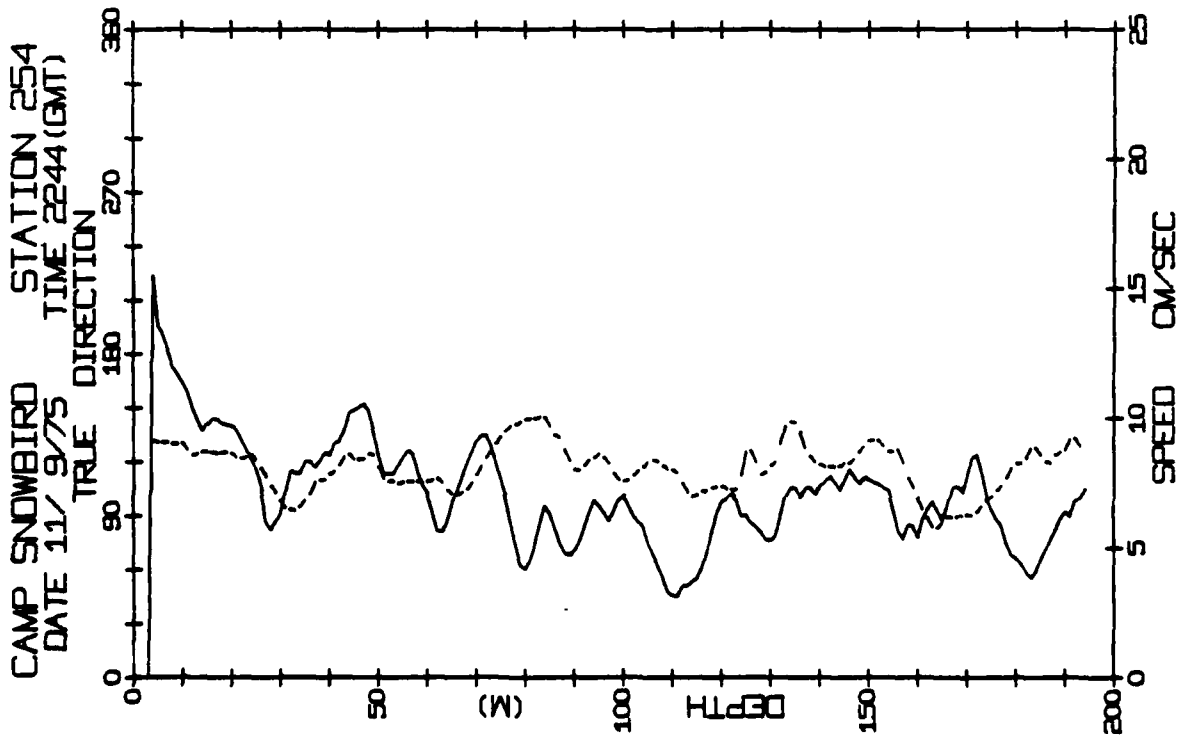


CAMP SNOWBIRD STATION 247
 DATE 8/9/75 TIME 2244(GMT)

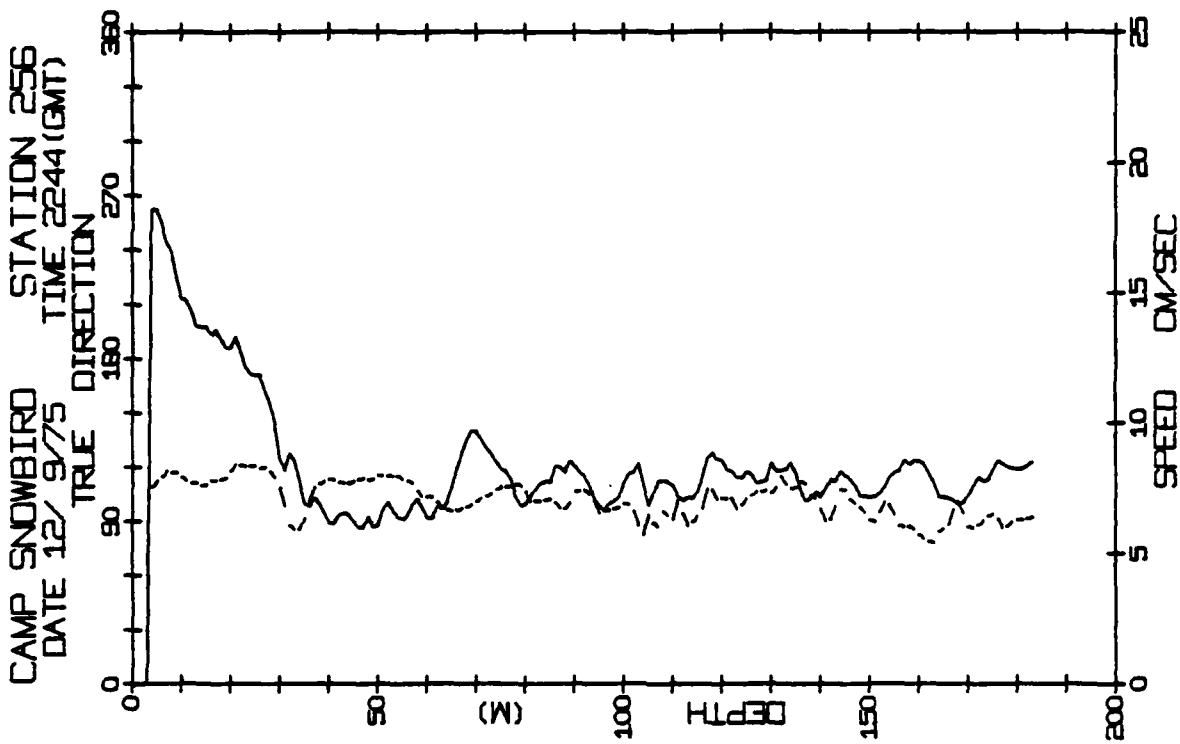




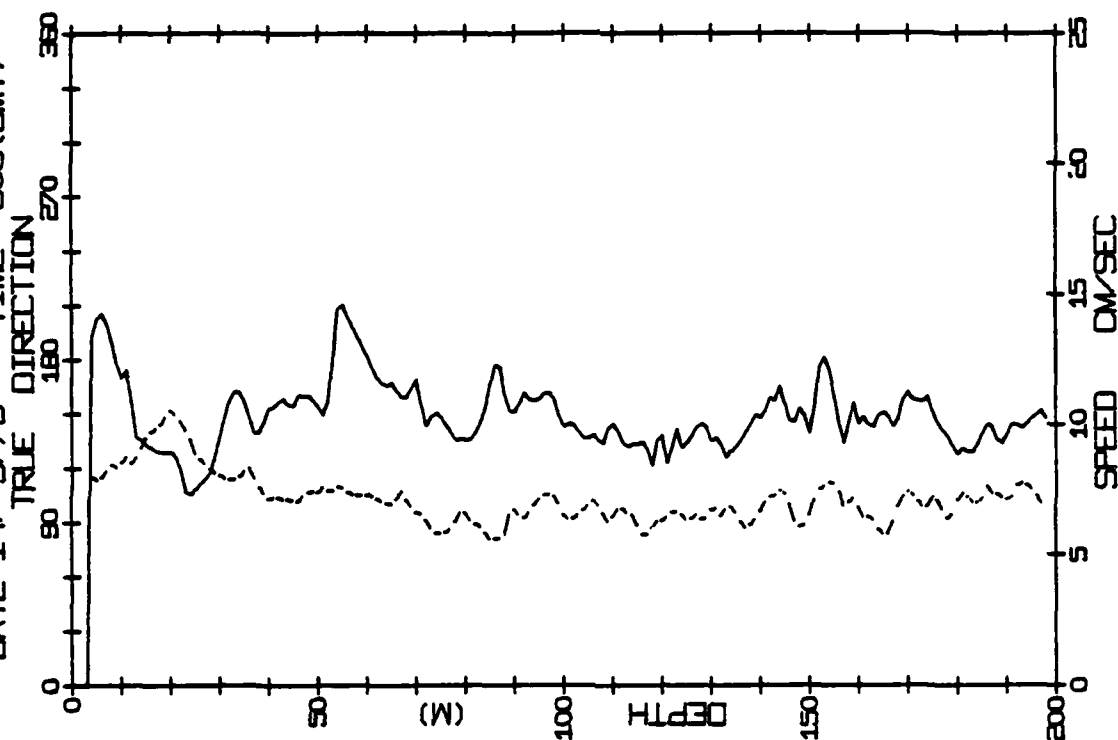




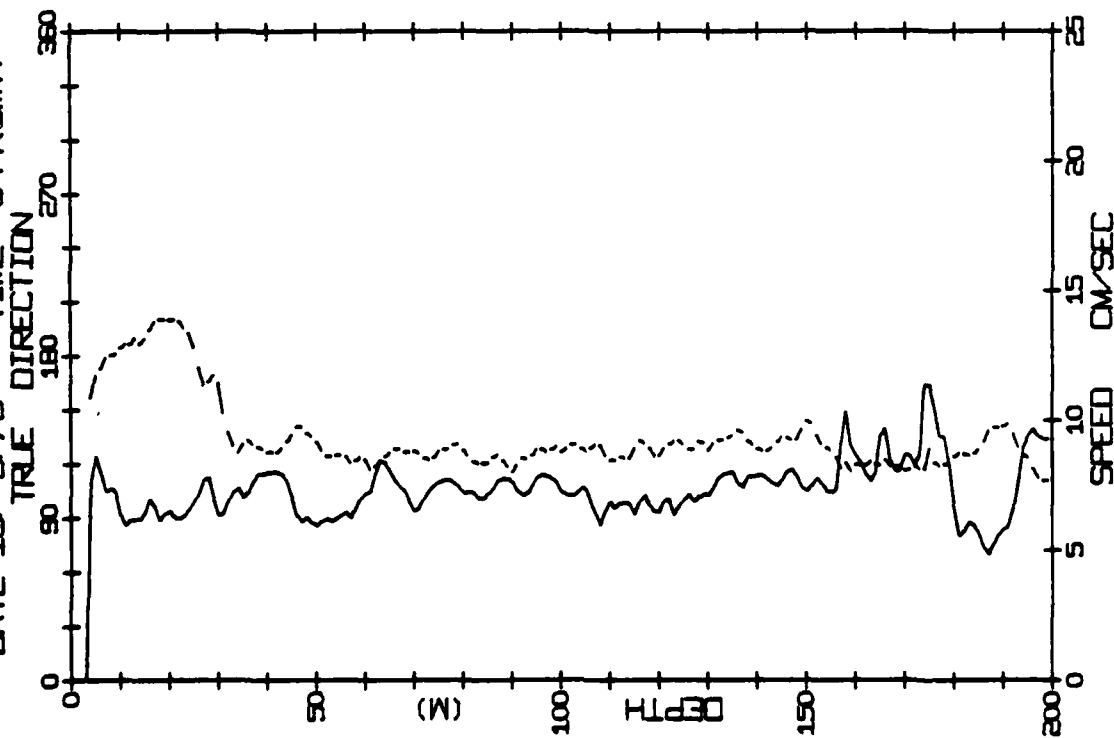
256

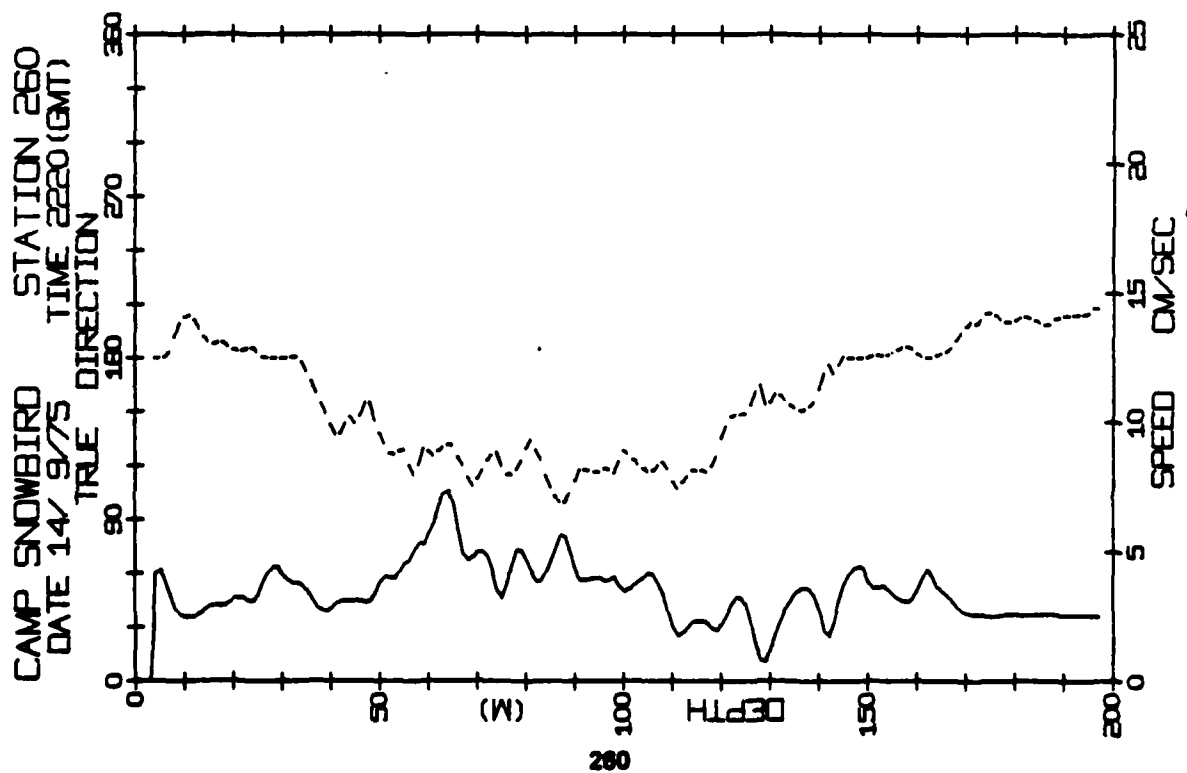
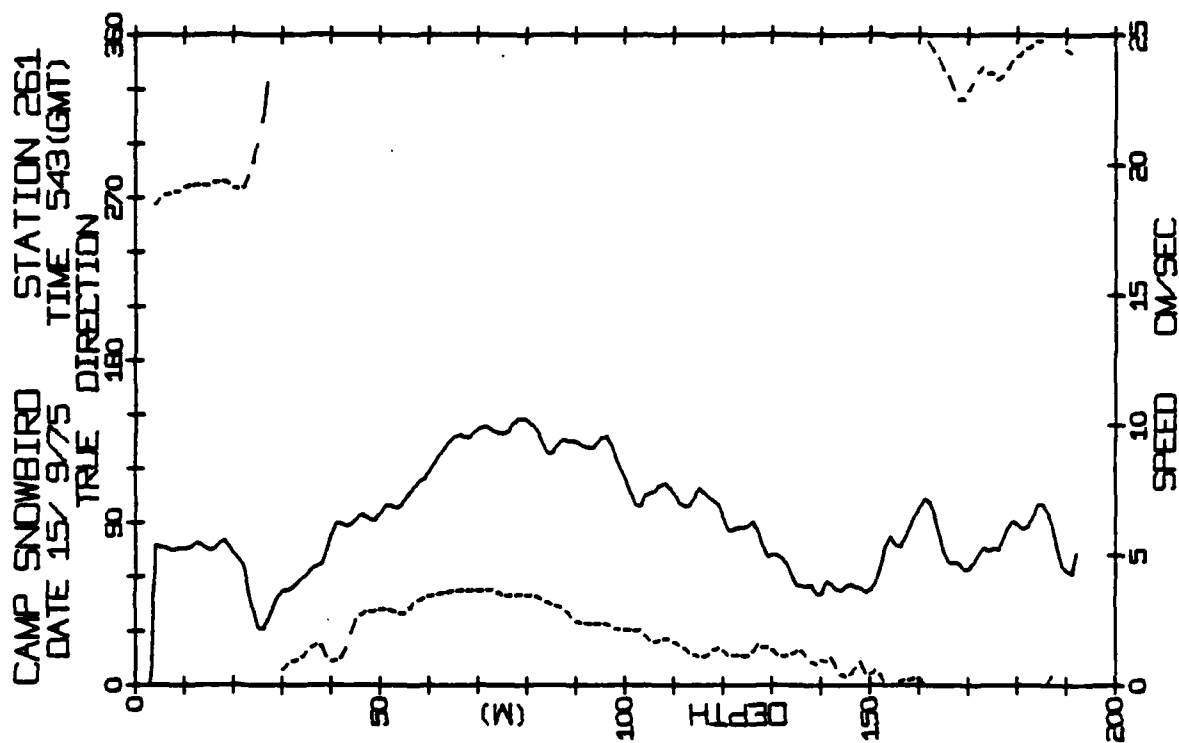


CAMP SNOWBIRD STATION 259
DATE 14/ 9/75 TIME 606(GMT)

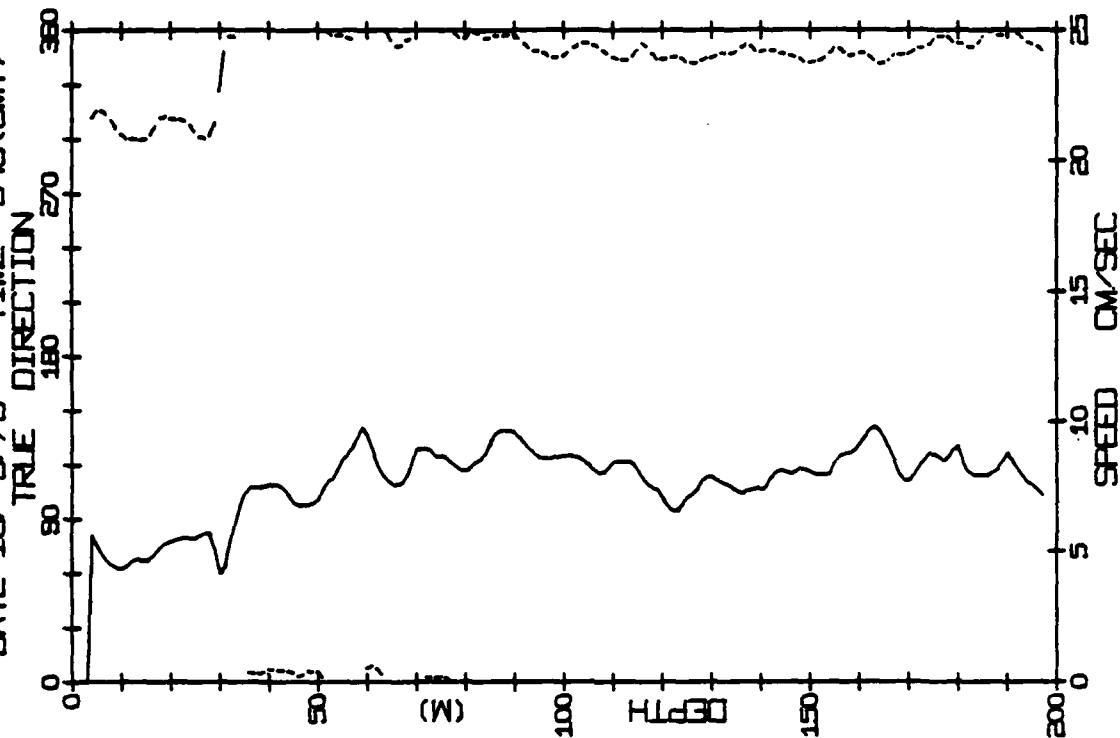


CAMP SNOWBIRD STATION 257
DATE 13/ 9/75 TIME 544(GMT)

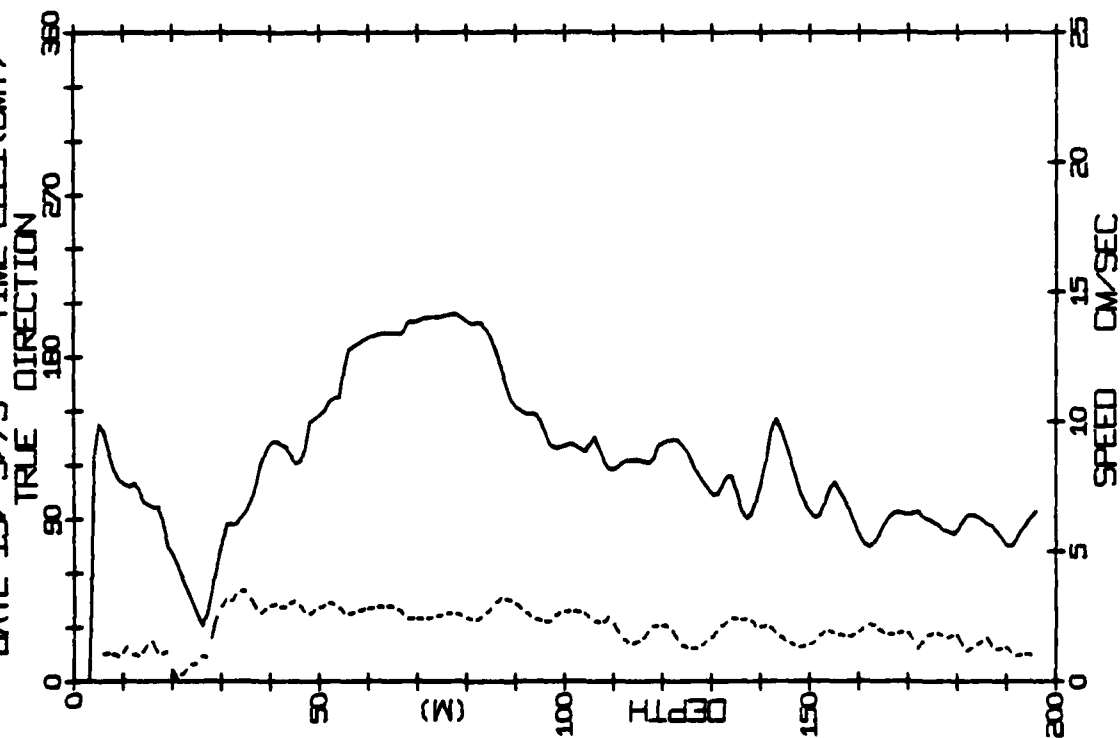




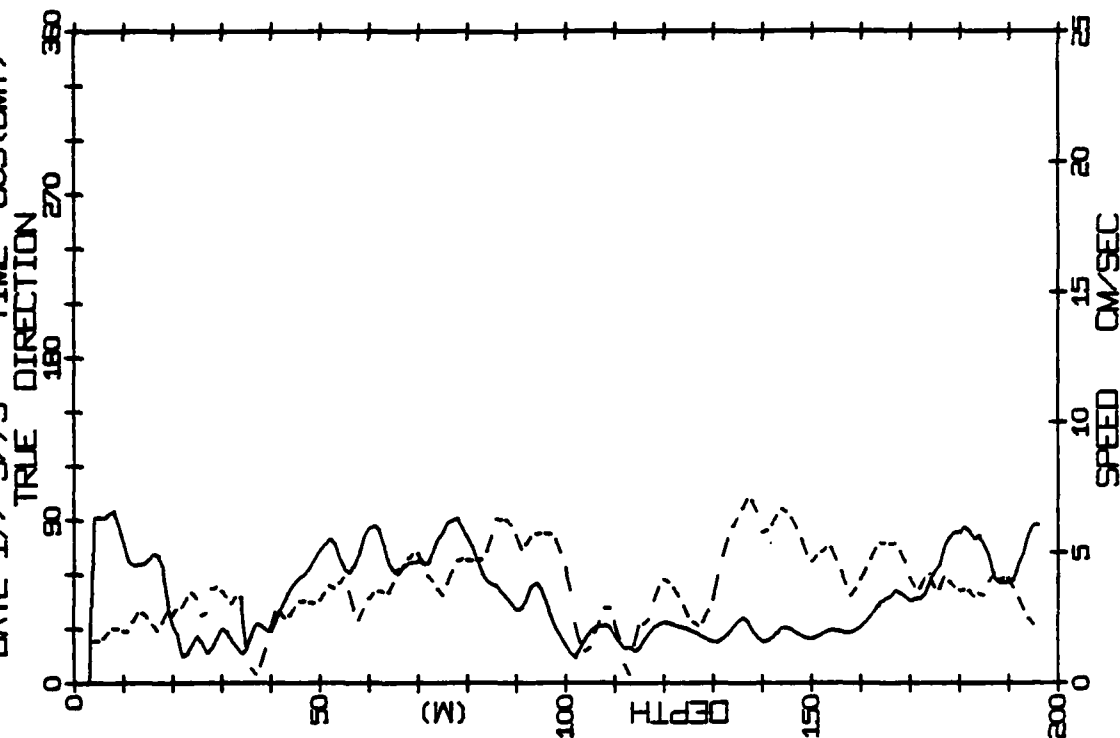
CAMP SNOWBIRD STATION 263
DATE 16/ 9/75 TIME 543(GMT)



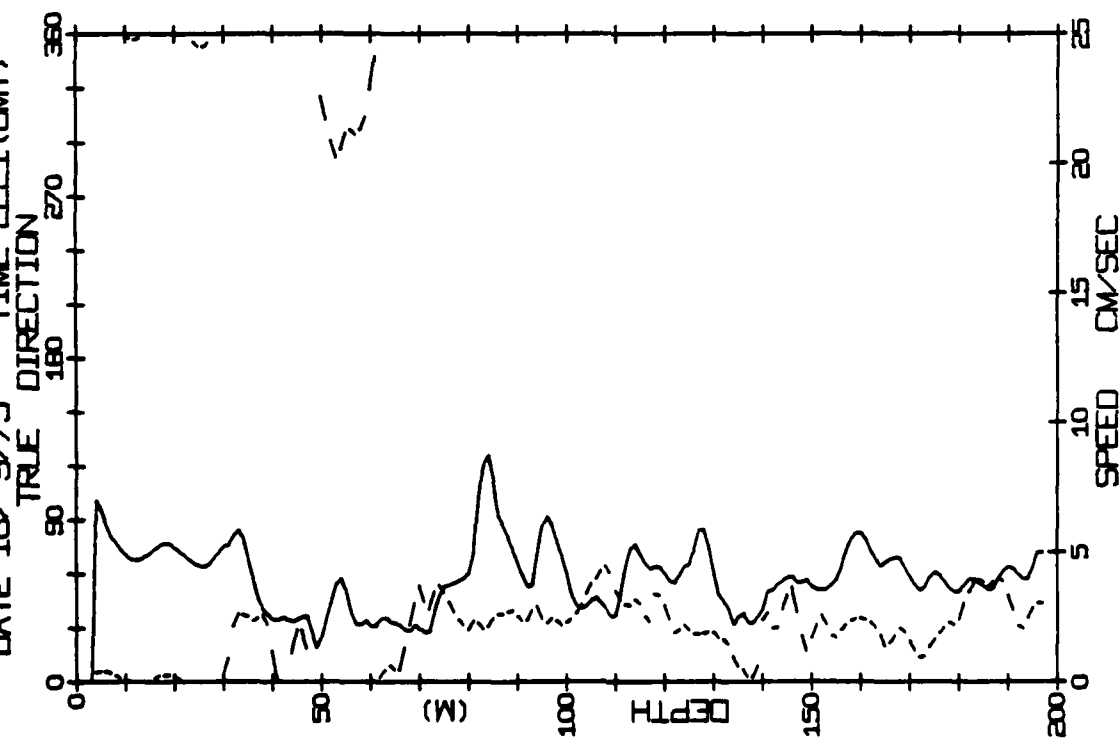
CAMP SNOWBIRD STATION 262
DATE 15/ 9/75 TIME 2221(GMT)

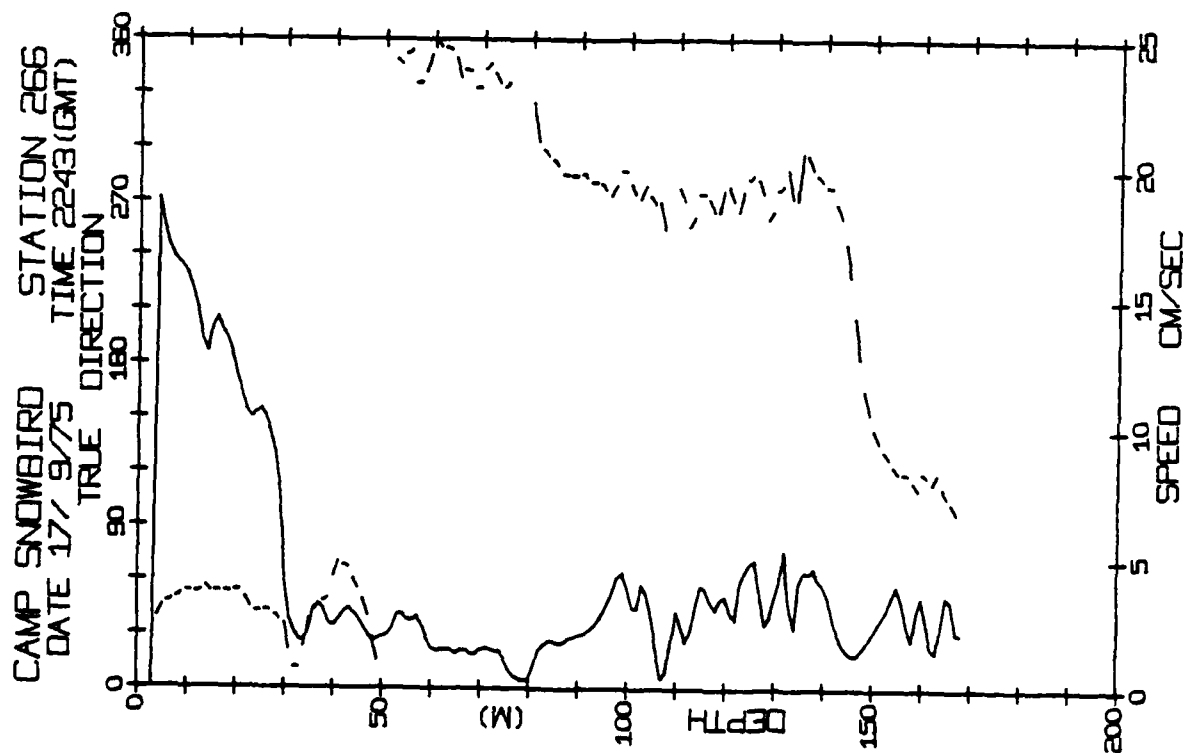
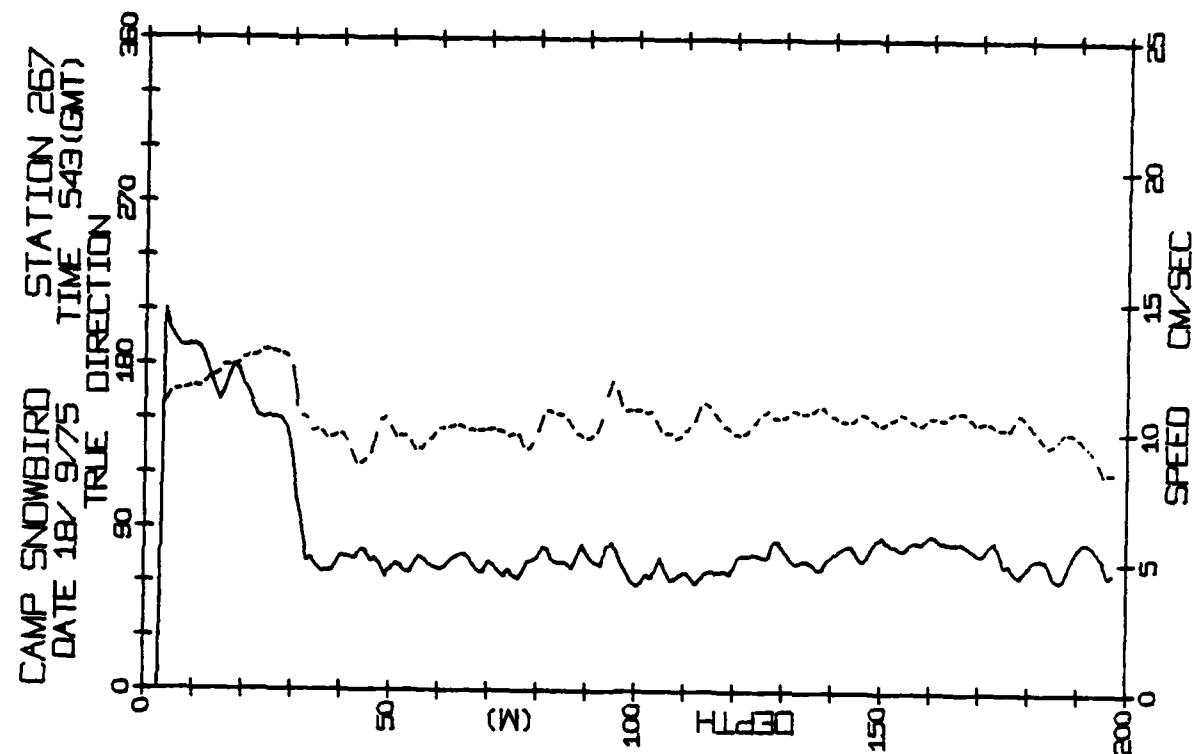


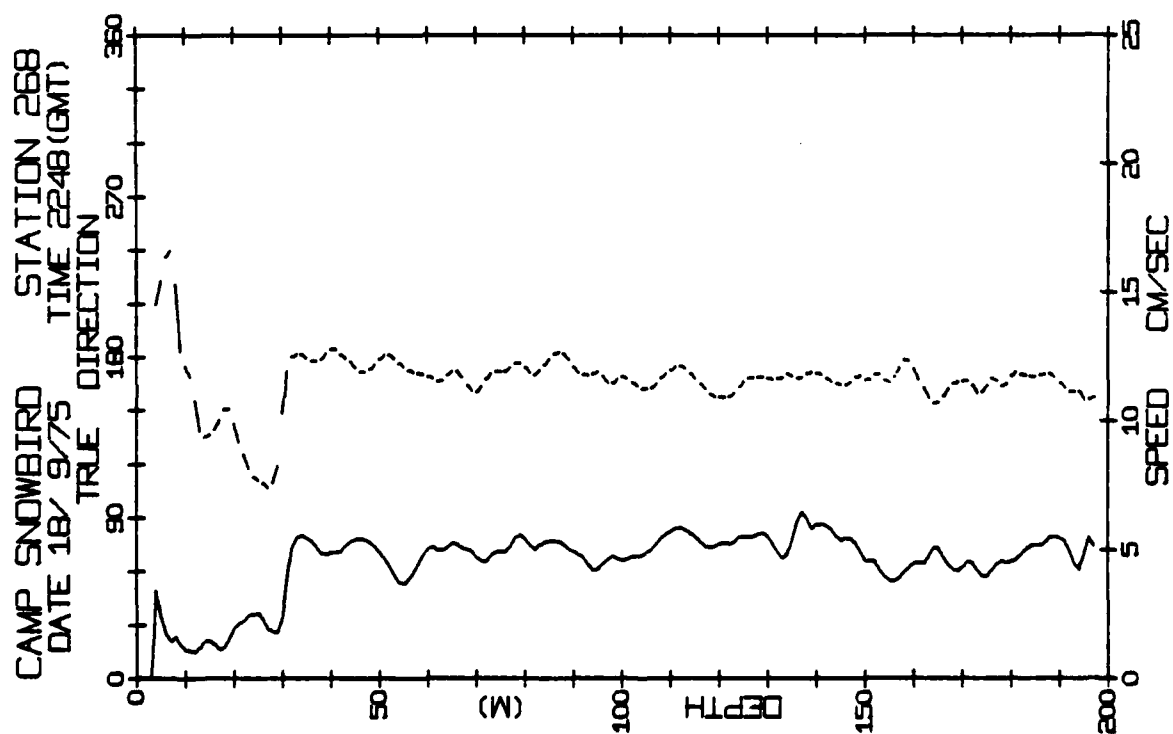
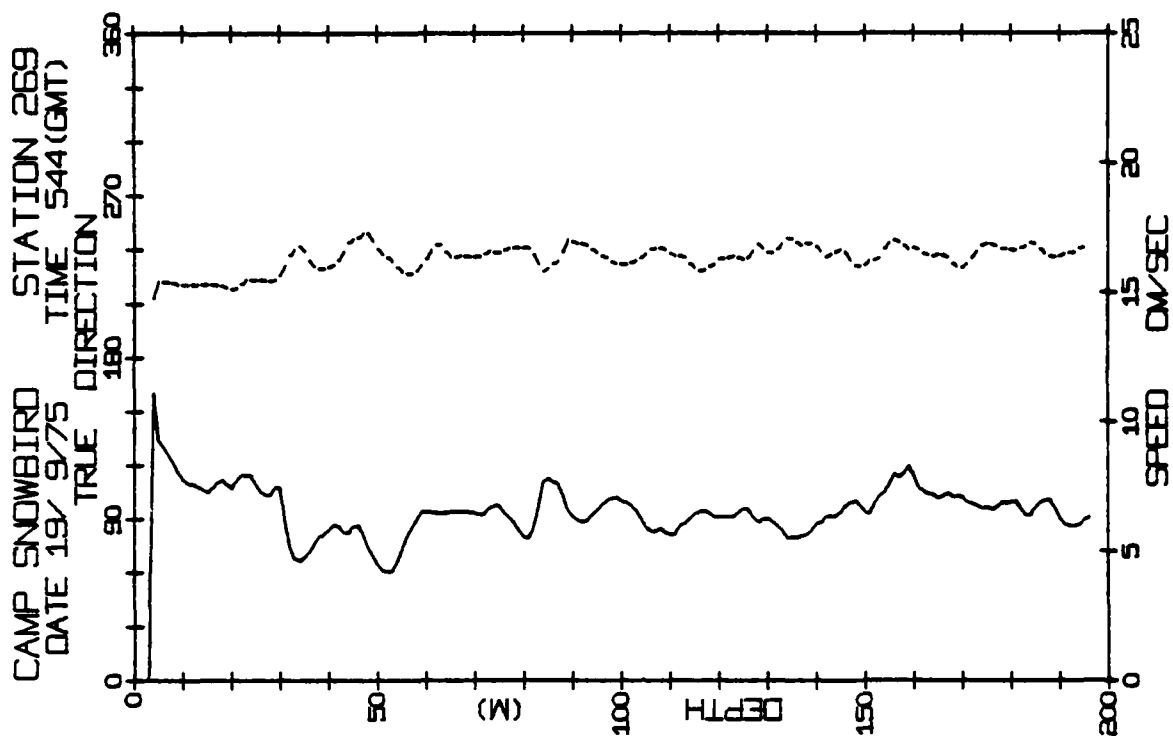
CAMP SNOWBIRD STATION 265
DATE 17/ 9/75 TIME 605(GMT)

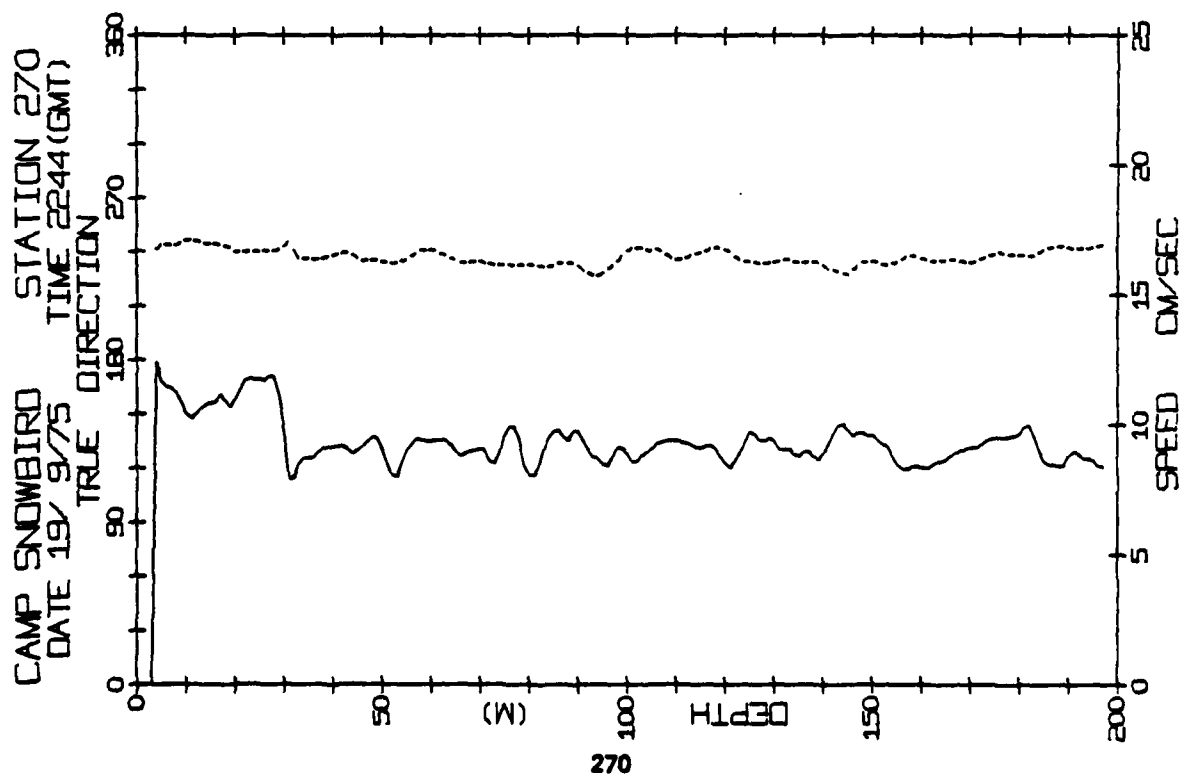
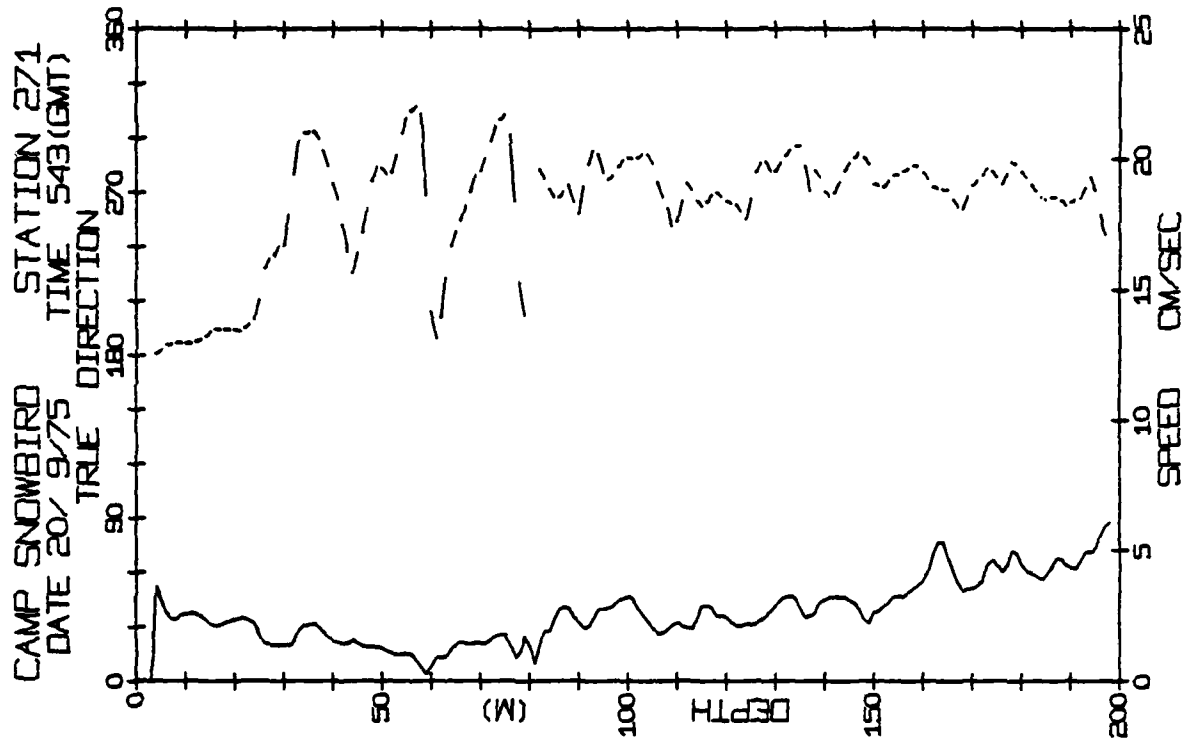


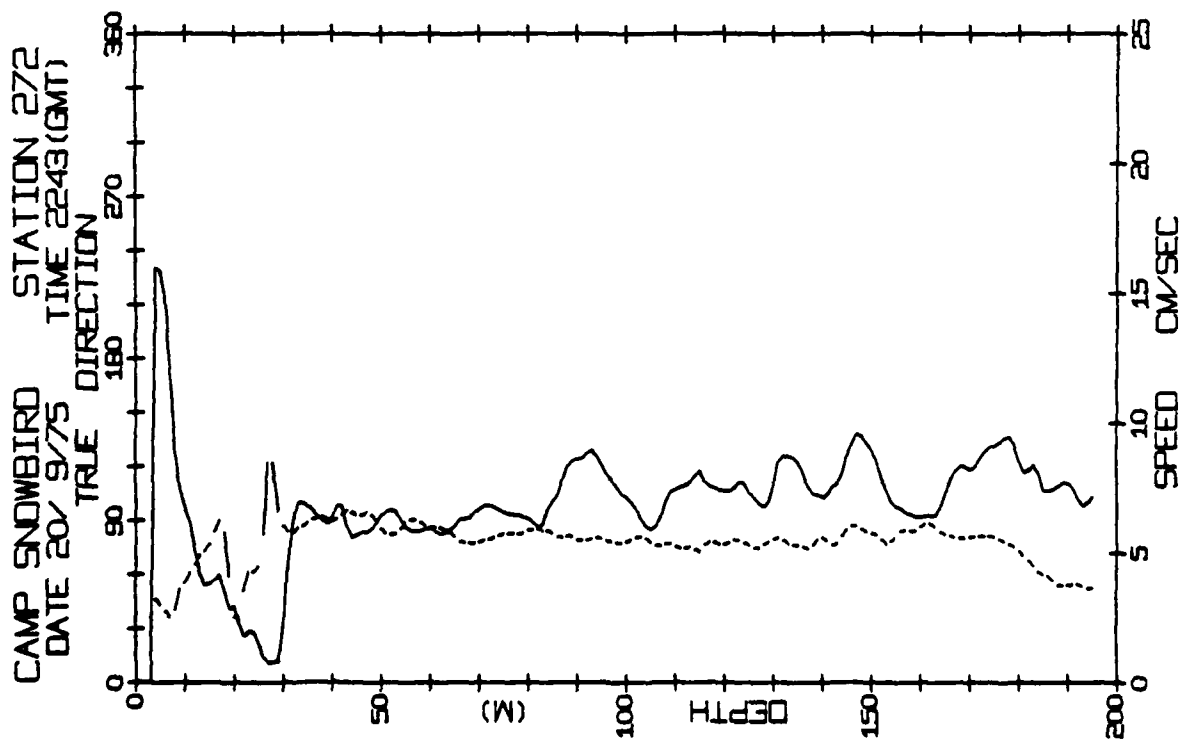
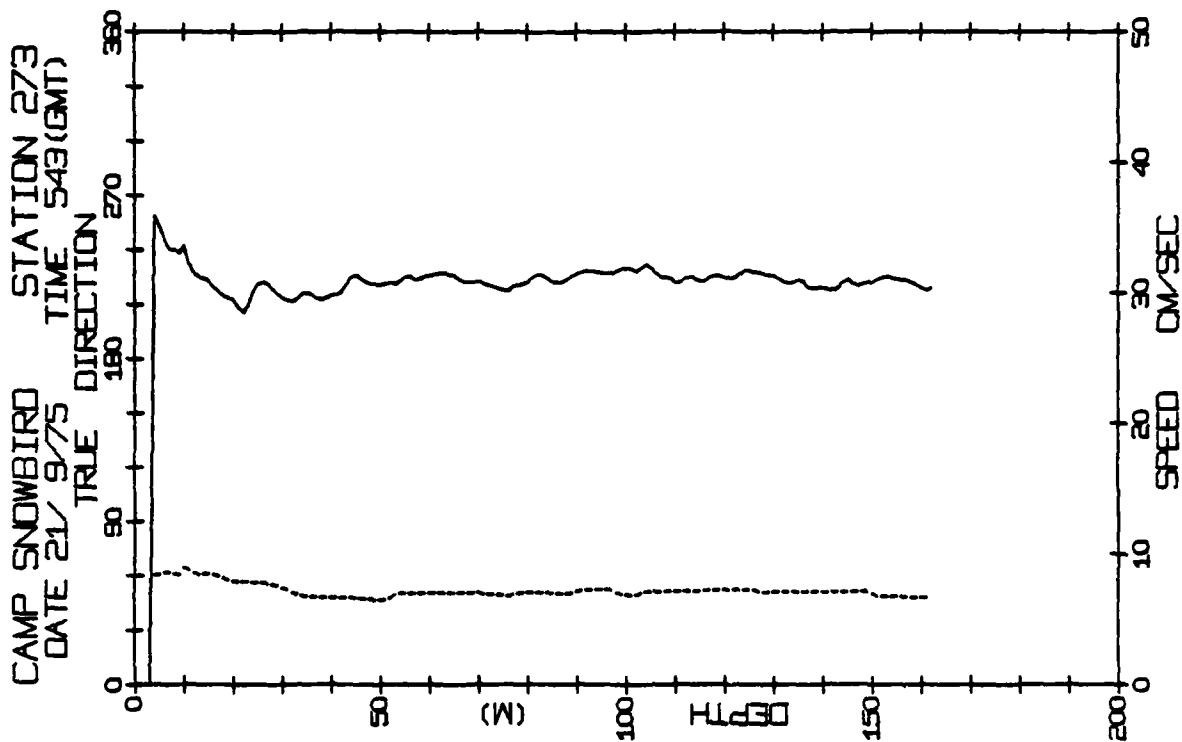
CAMP SNOWBIRD STATION 264
DATE 16/ 9/75 TIME 2221(GMT)

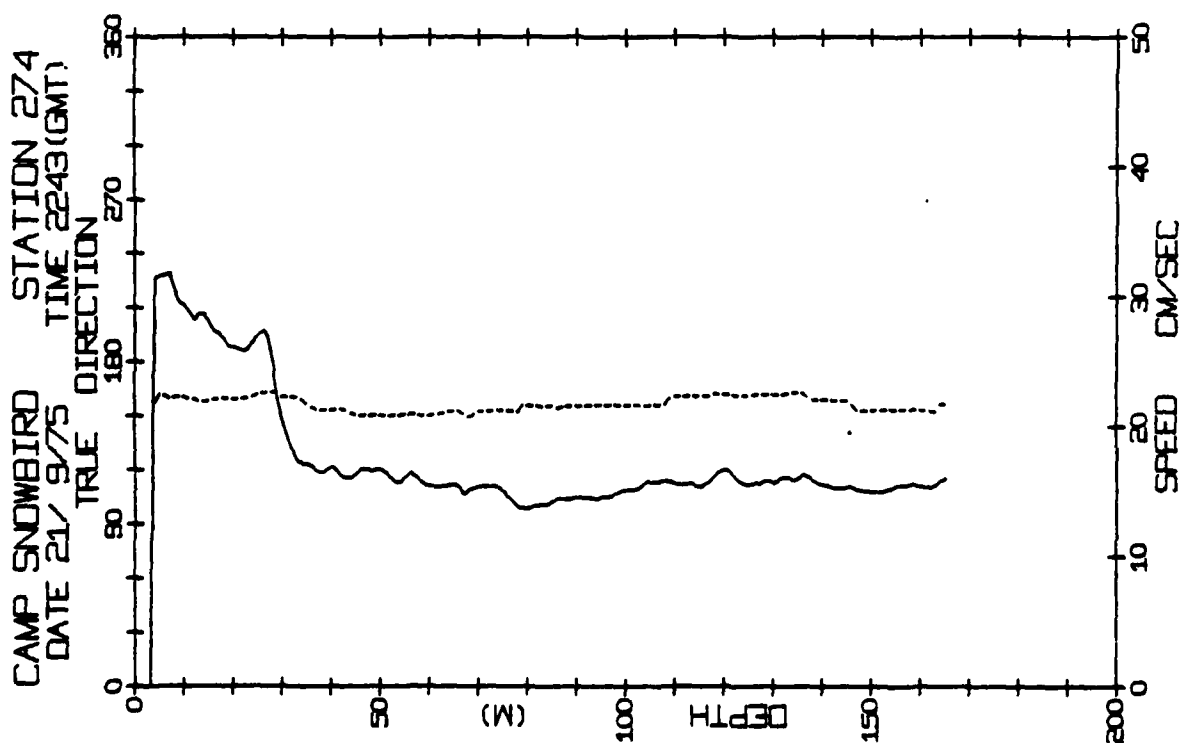
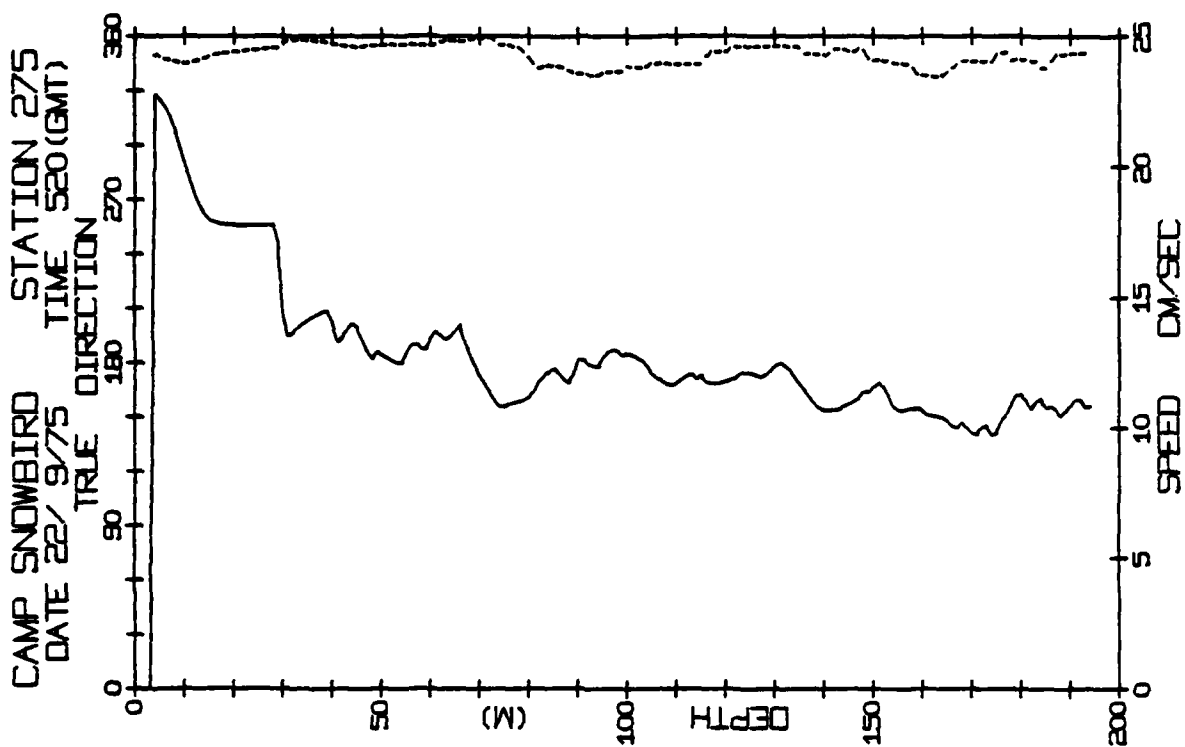




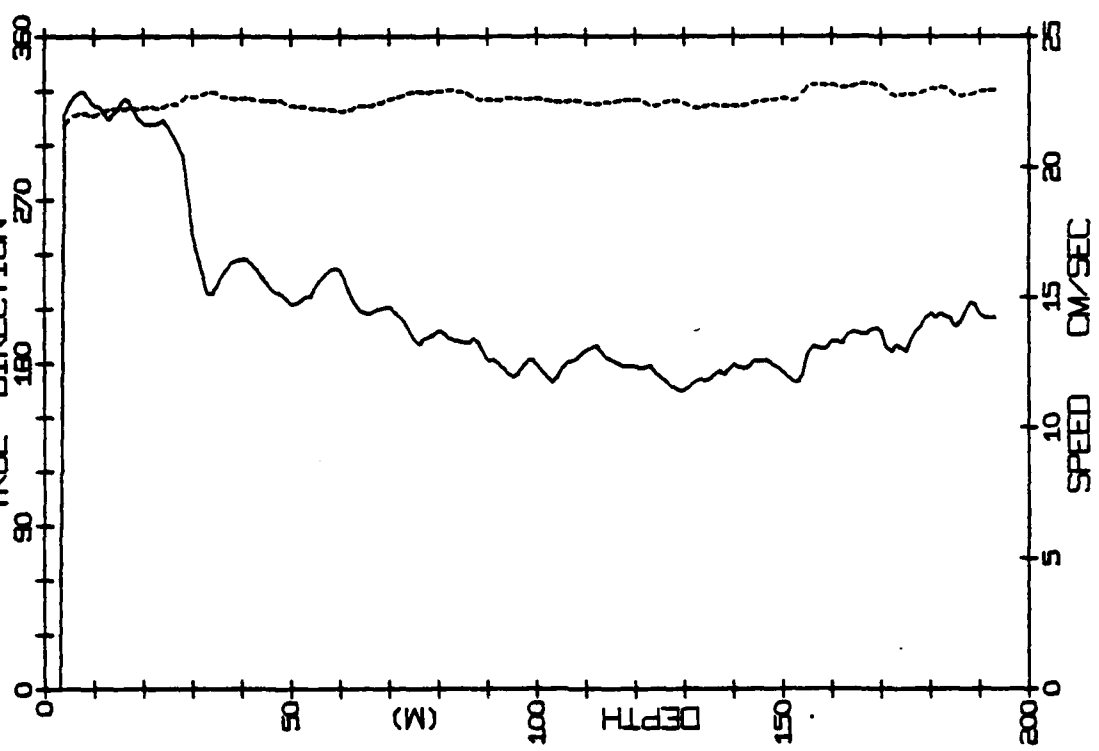




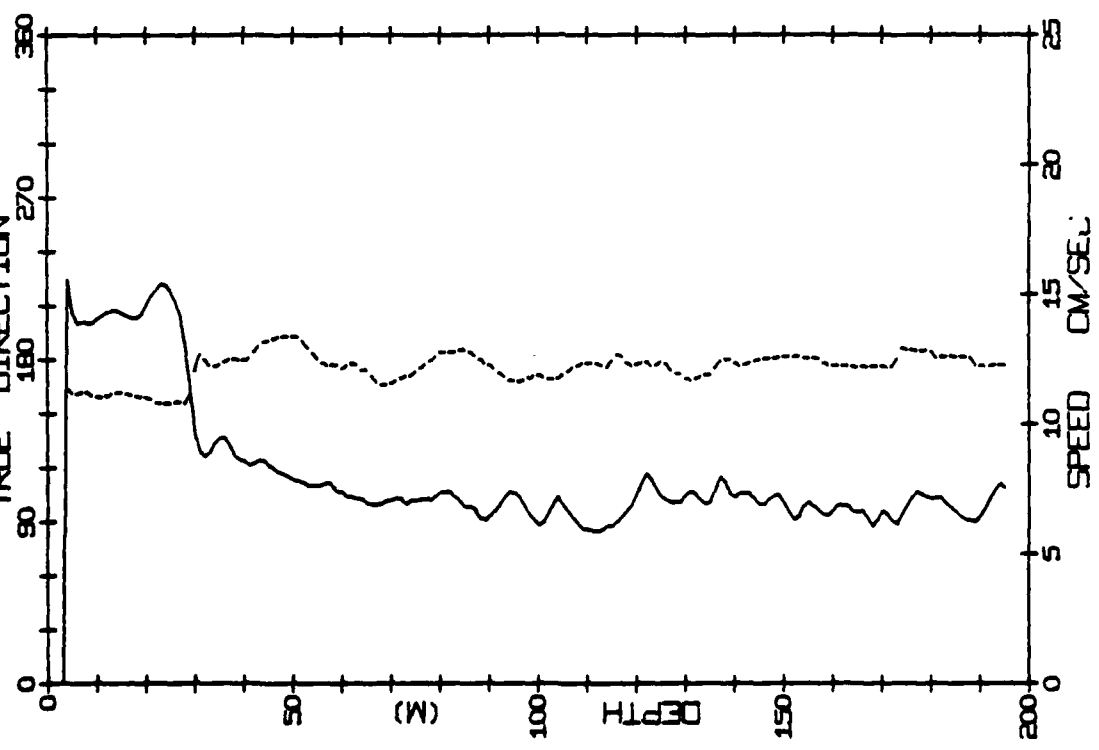


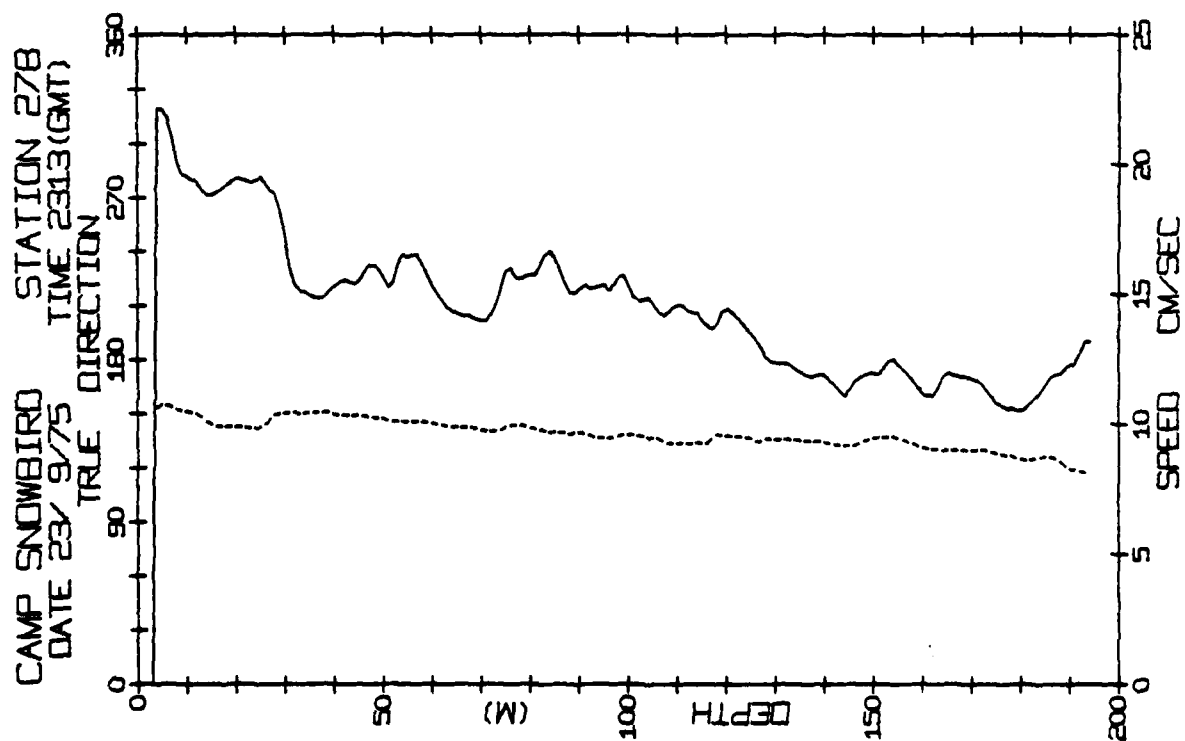
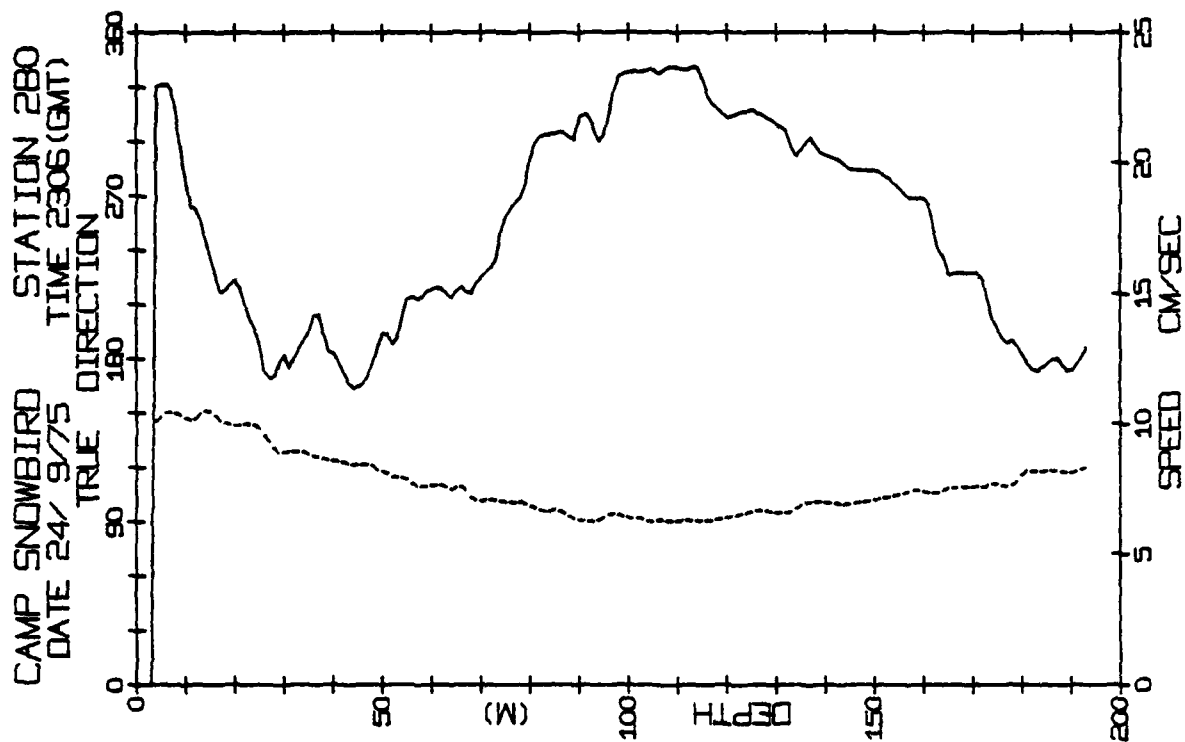


CAMP SNOWBIRD STATION 277
 DATE 23/ 9/75 TIME 543(GMT)
 TRUE DIRECTION



CAMP SNOWBIRD STATION 276
 DATE 22/ 9/75 TIME 2244(GMT)
 TRUE DIRECTION



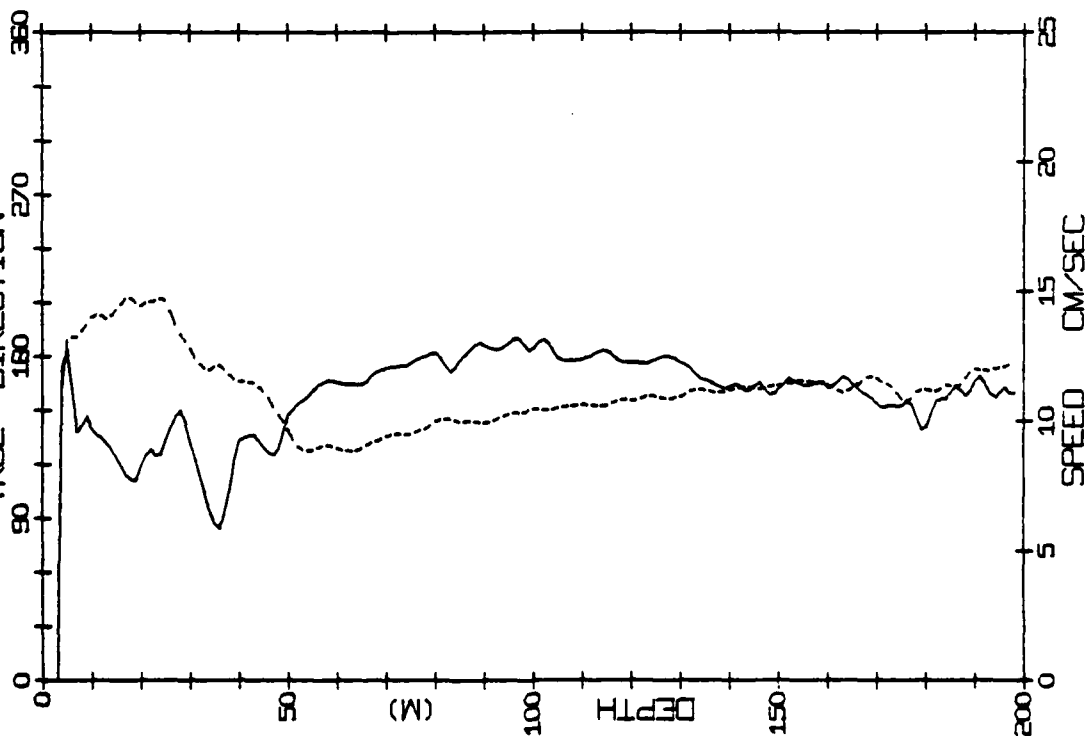


CAMP SNOWBIRD
DATE 25/ 9/75

STATION 281

TIME 543(GMT)

TRUE DIRECTION



280

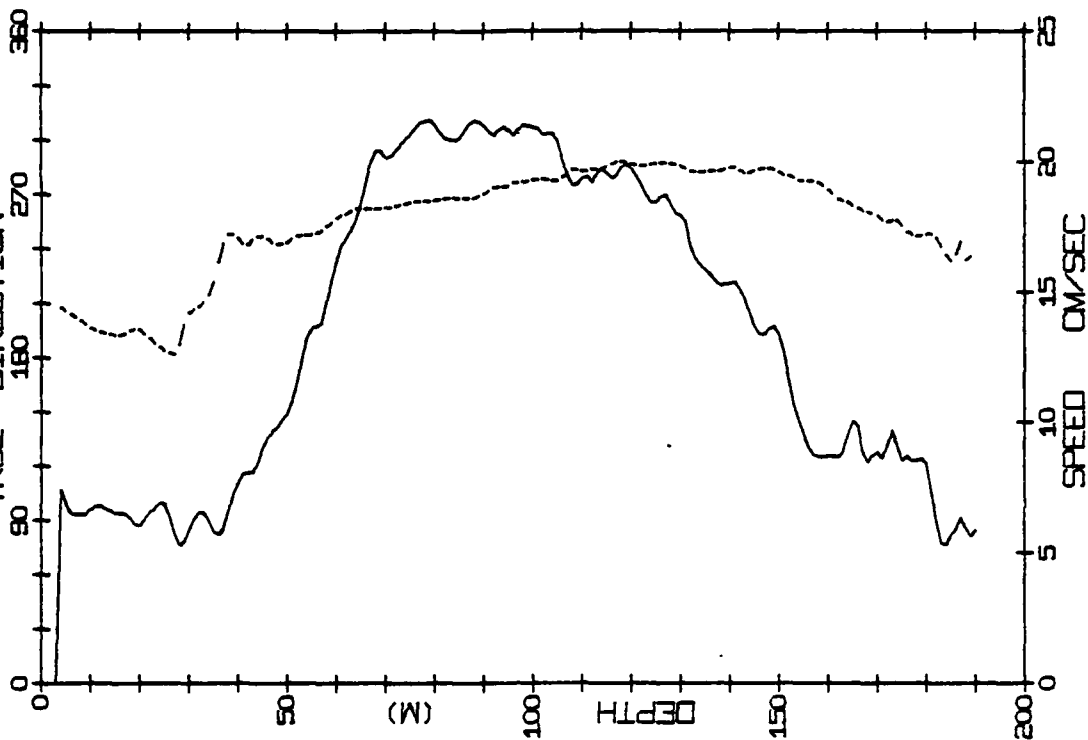
CAMP SNOWBIRD

STATION 282

DATE 25/ 9/75

TIME 2243(GMT)

TRUE DIRECTION



AD-A109 990

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY PALISADES NY

F/6 8/3

ARCTIC ICE DYNAMICS JOINT EXPERIMENT 1975-1976 PHYSICAL OCEANOGRAPHY--ETC(U)

FEB 80 T O MANLEY, K HUNKINS, W TIEMANN

N00014-76-C-0004

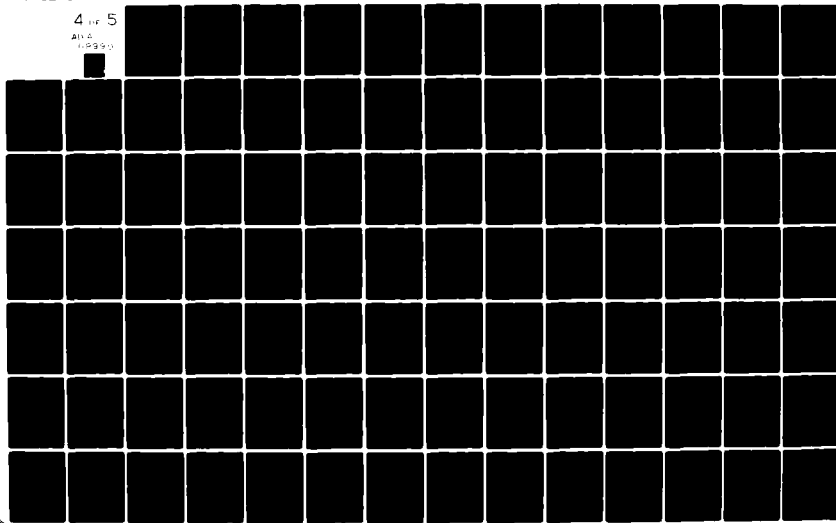
NL

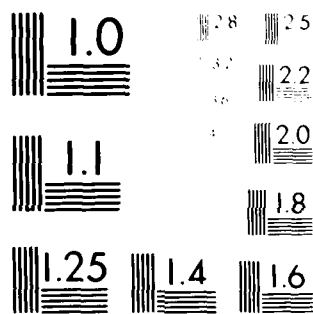
UNCLASSIFIED

LDGO-CU-6-80

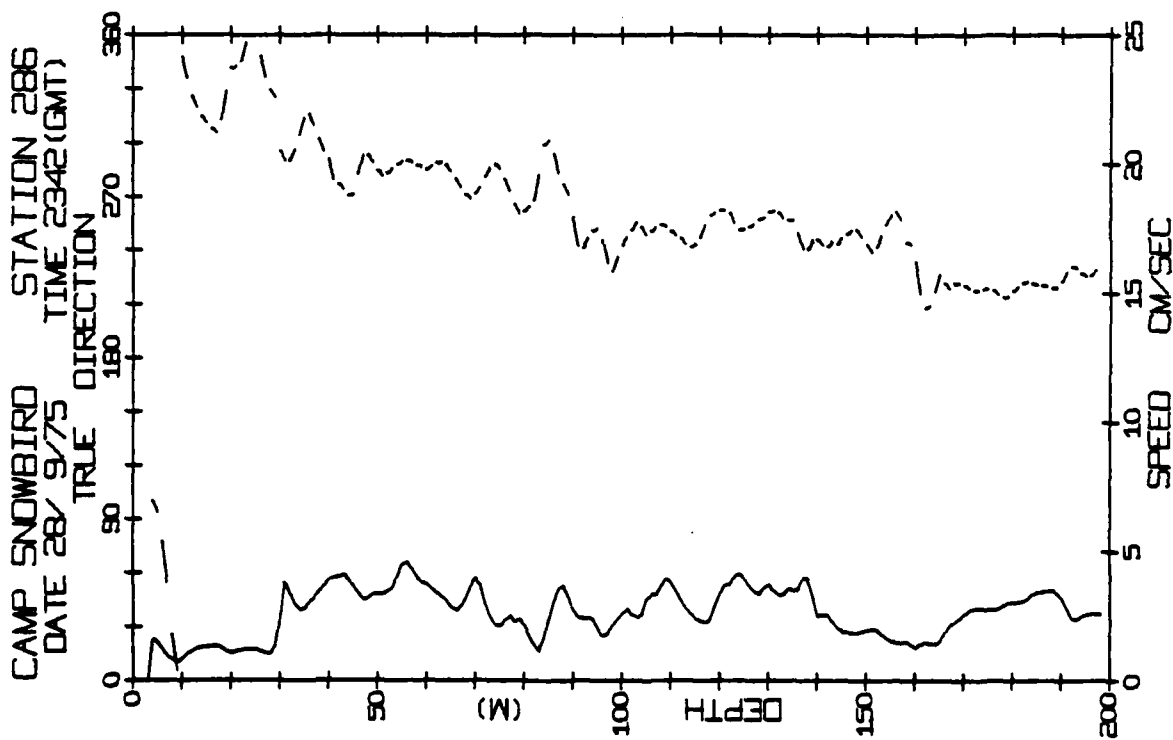
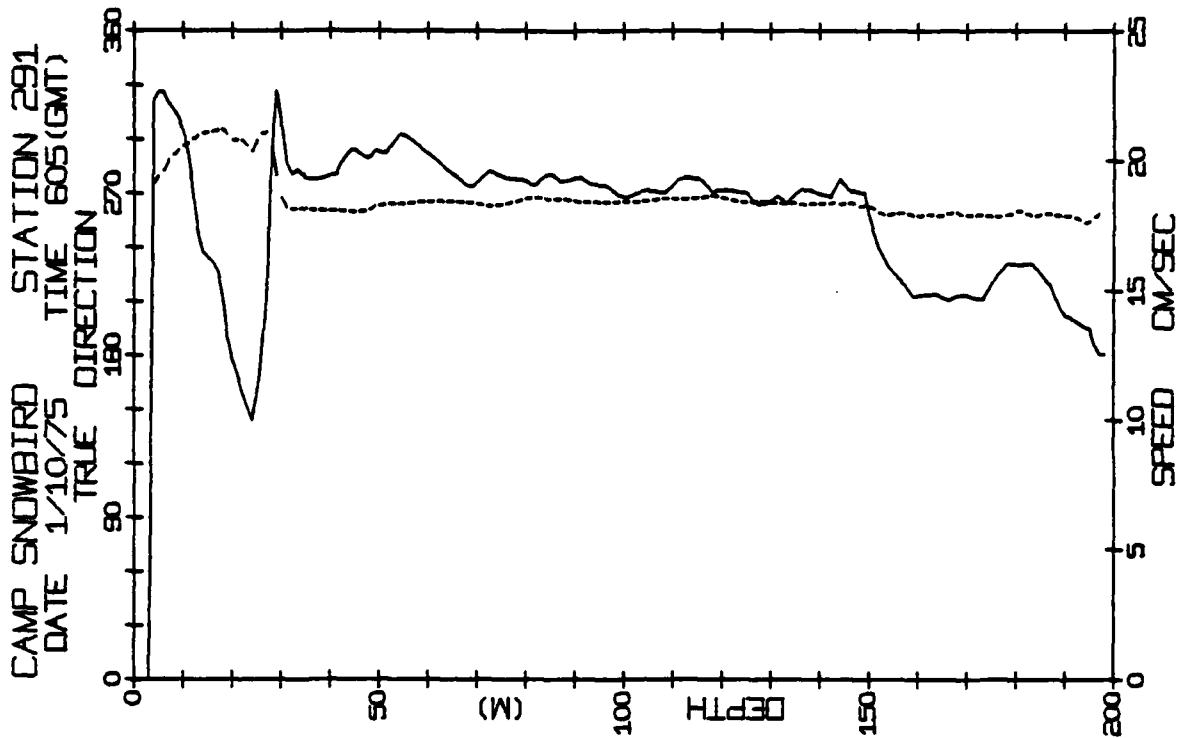
4 of 5

AD-A109 990

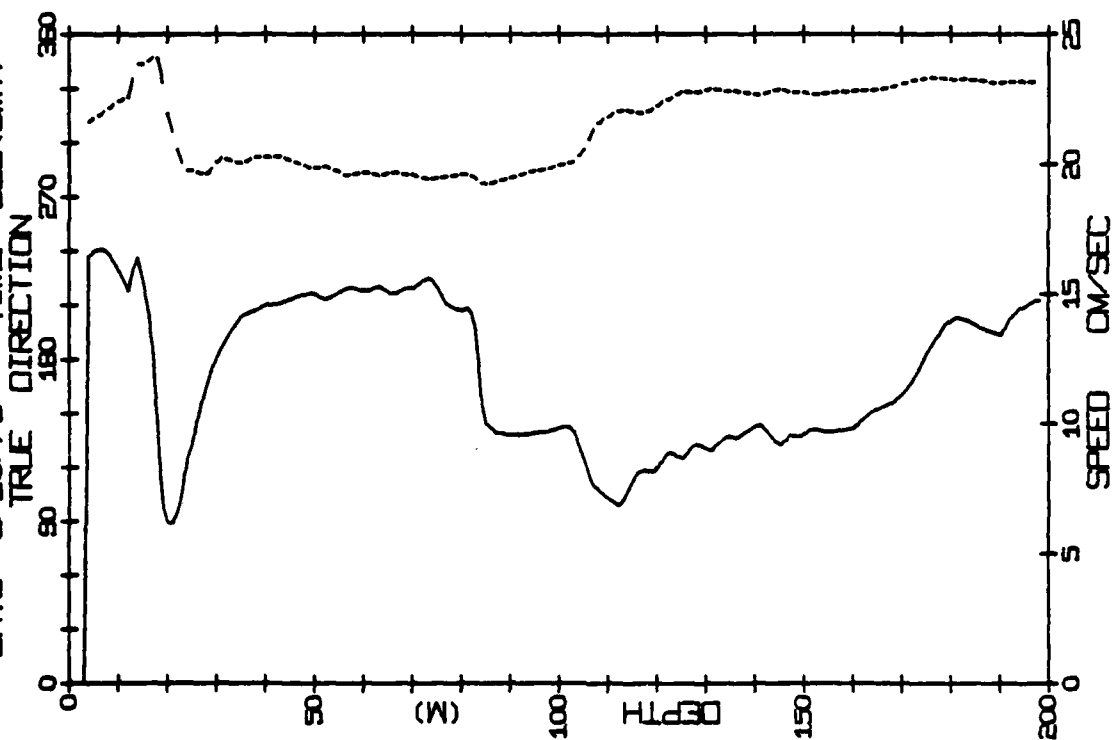




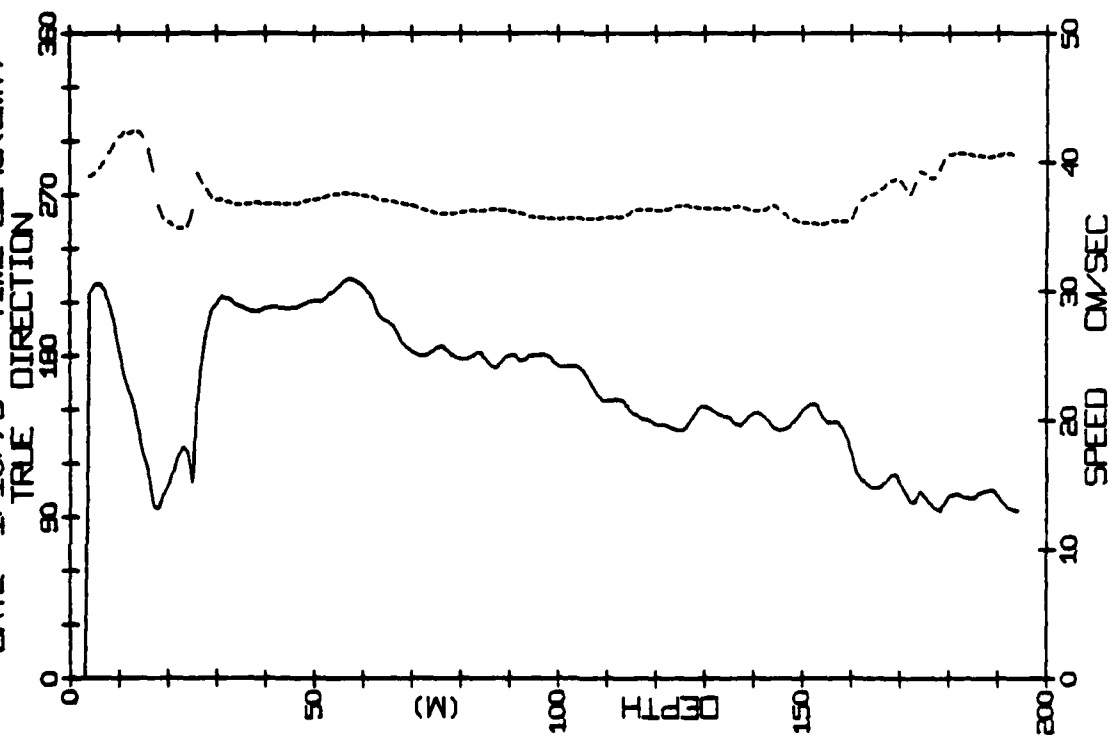
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

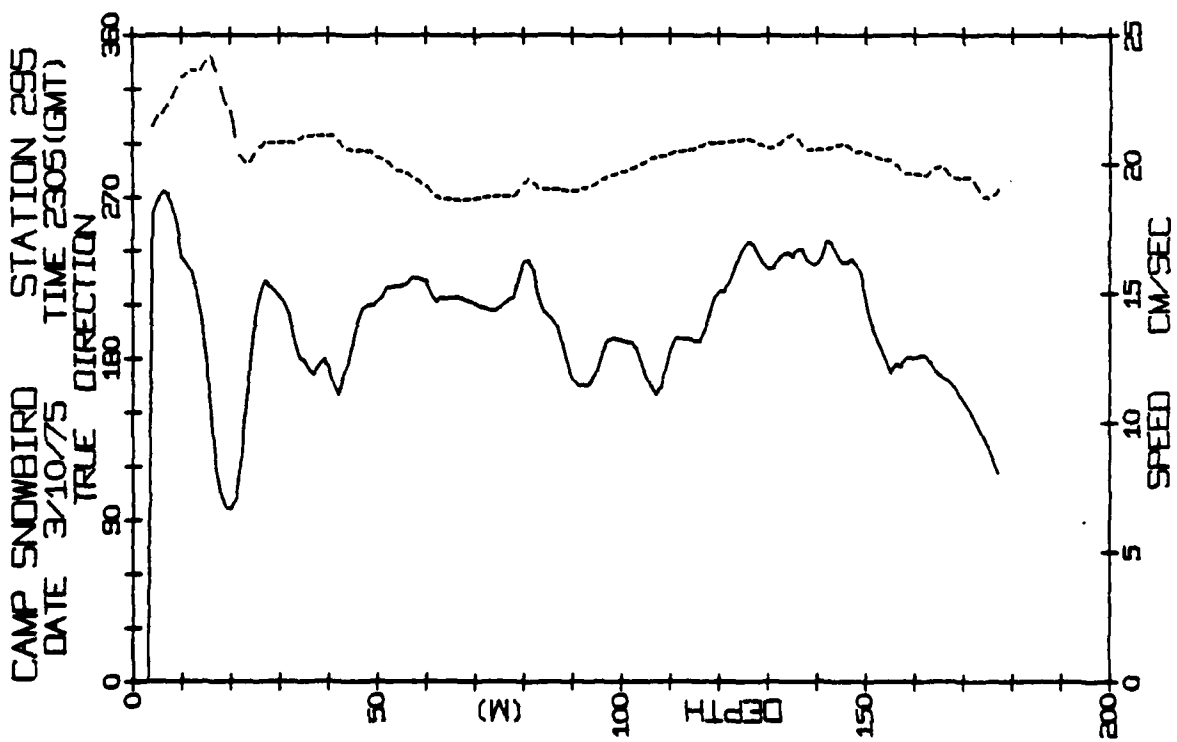
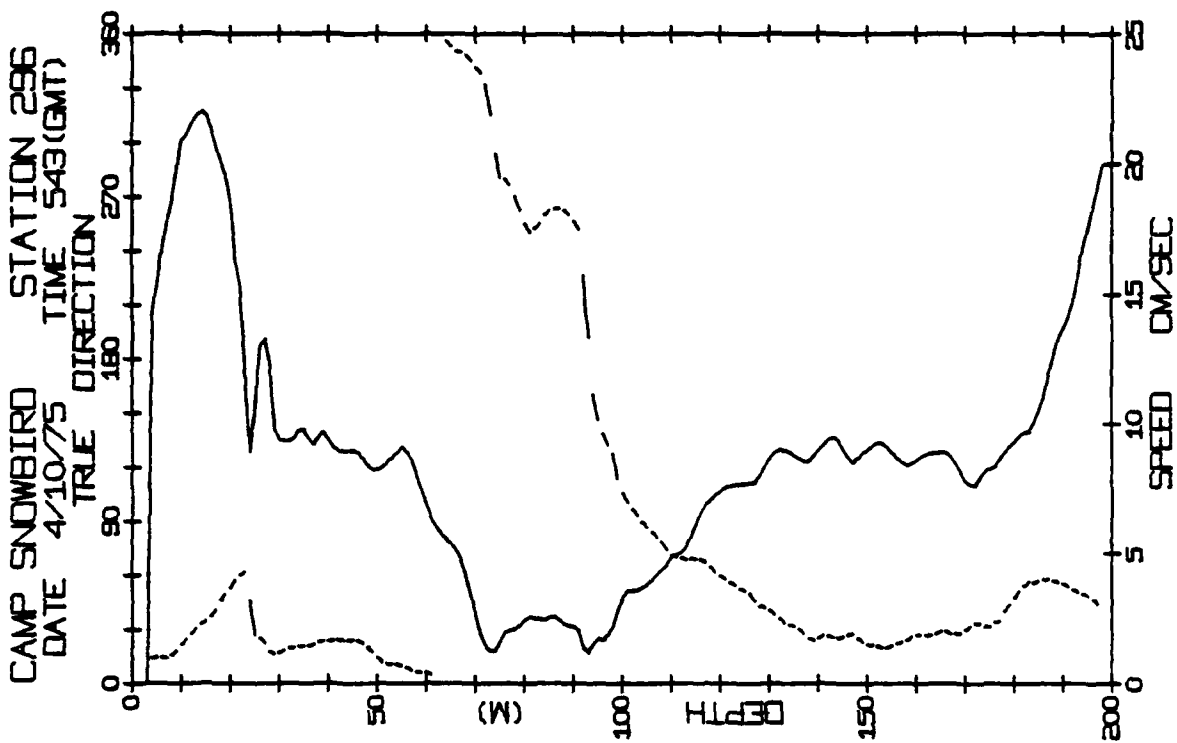


CAMP SNOWBIRD STATION 294
 DATE 3/10/75 TIME 521 (GMT)

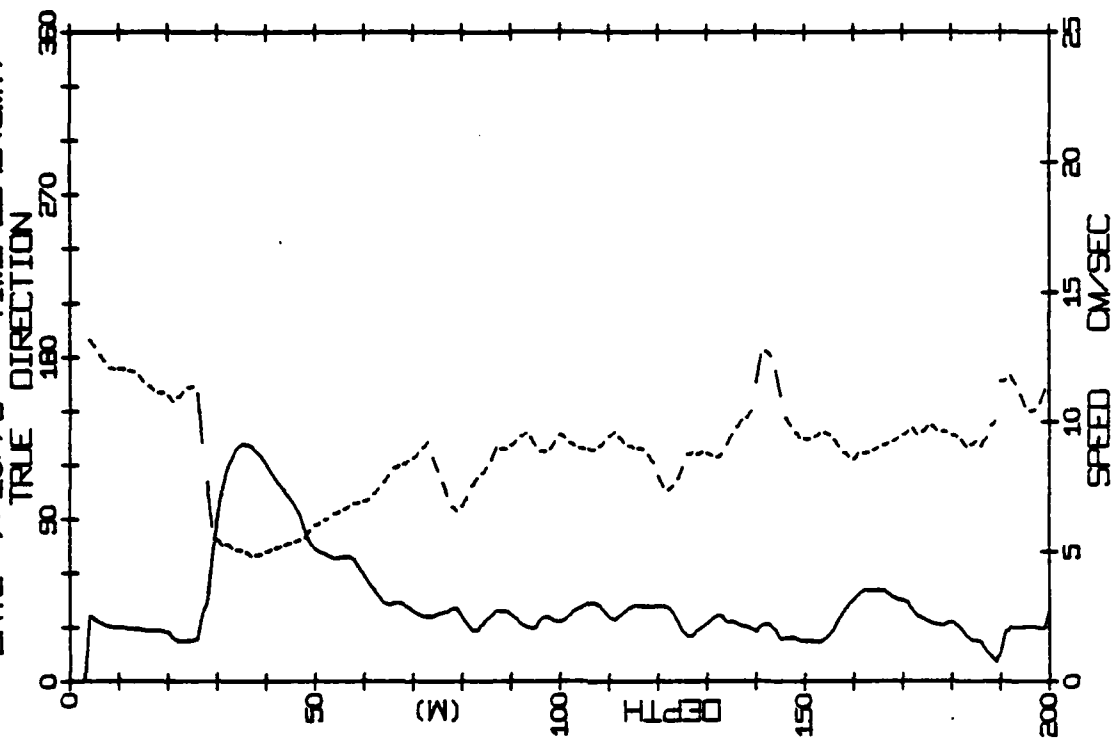


CAMP SNOWBIRD STATION 292
 DATE 1/10/75 TIME 2246 (GMT)

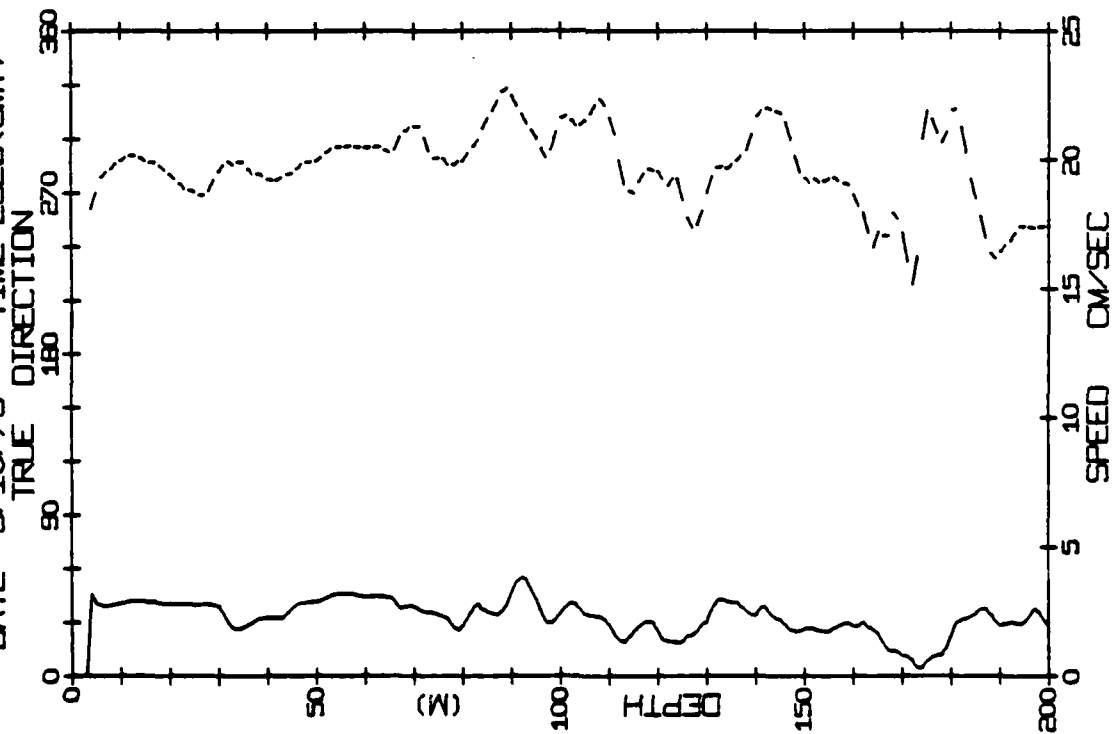


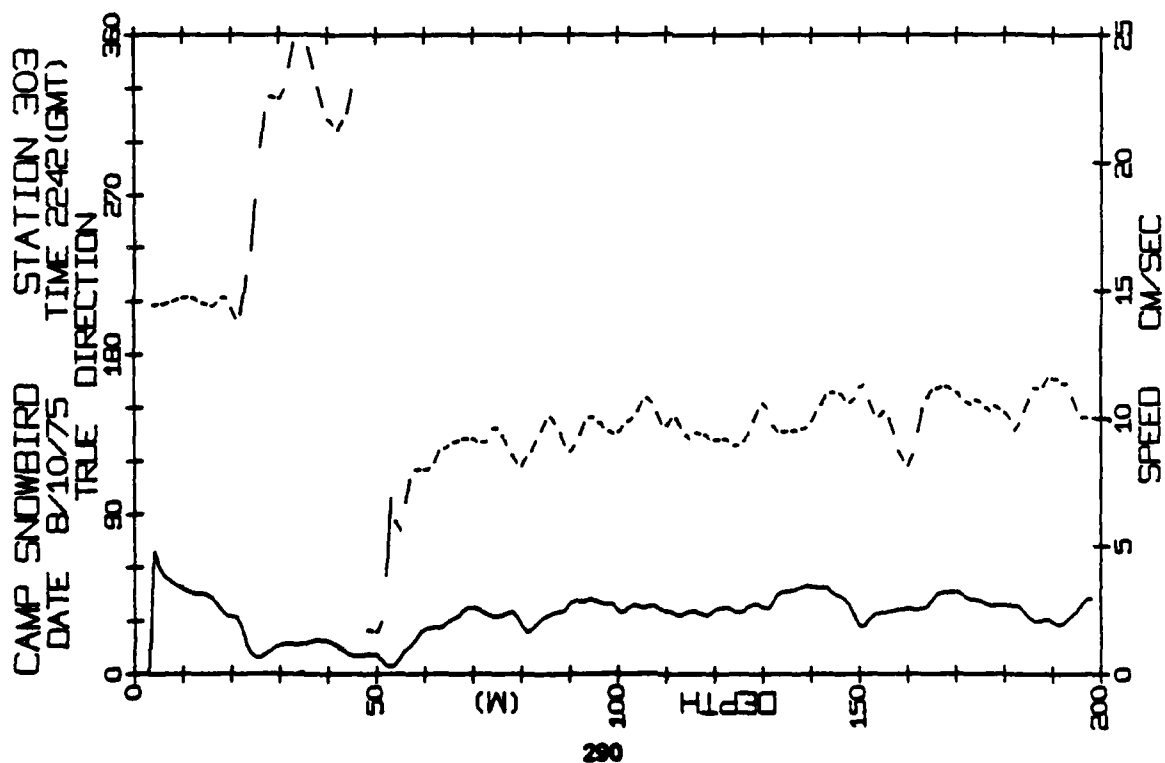
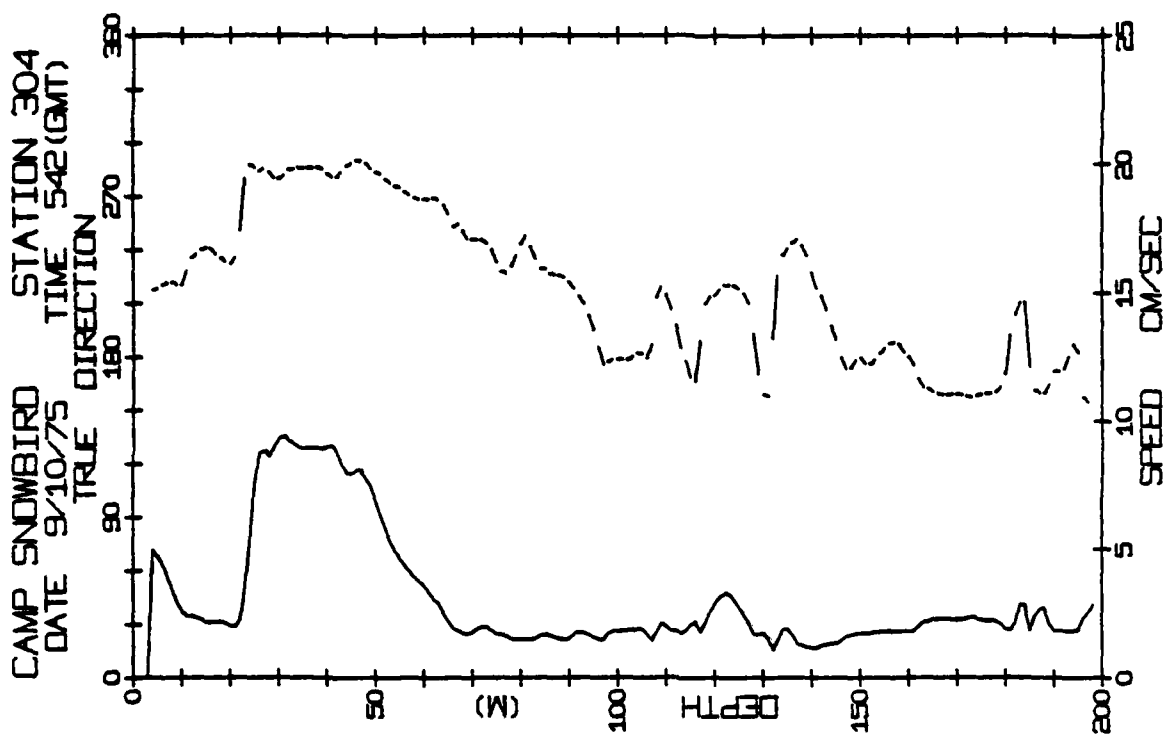


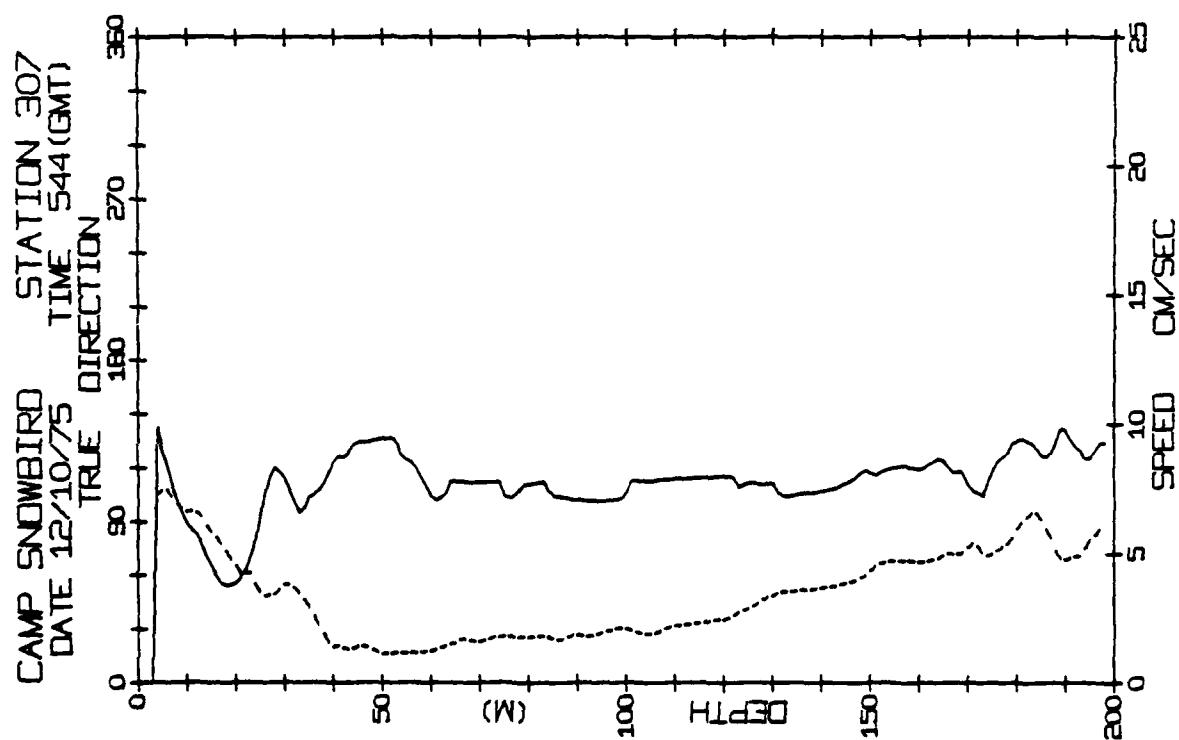
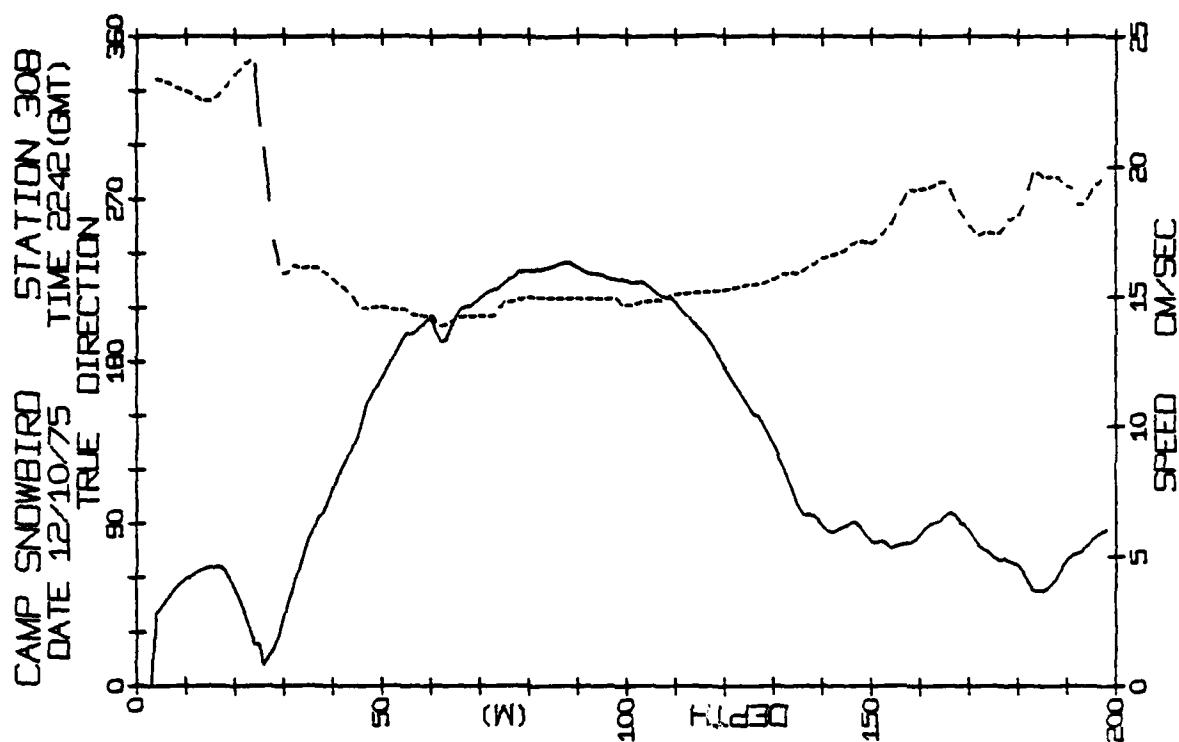
CAMP SNOWBIRD STATION 301
DATE 7/10/75 TIME 2242(GMT)



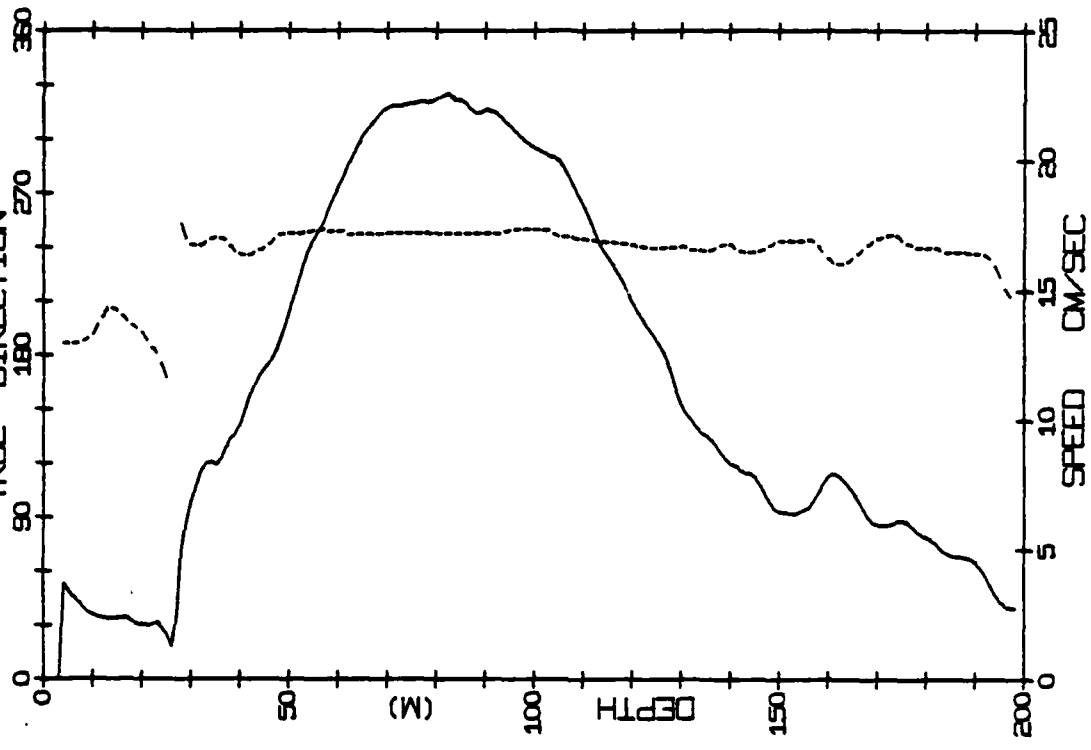
CAMP SNOWBIRD STATION 298
DATE 5/10/75 TIME 2328(GMT)



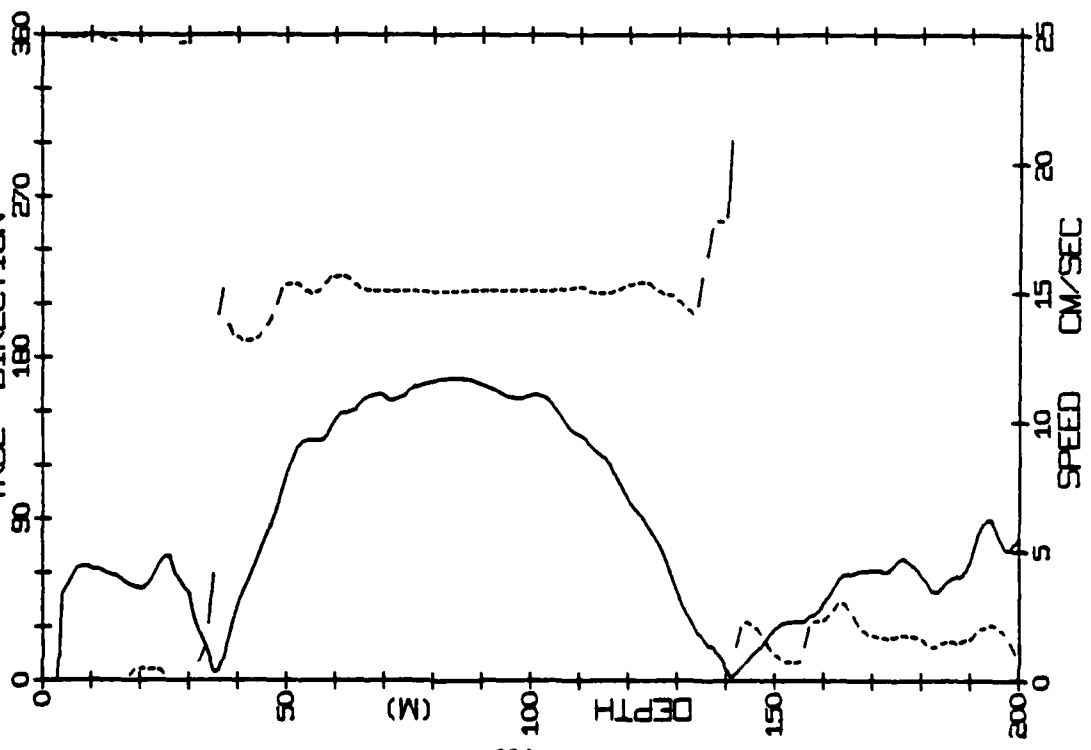




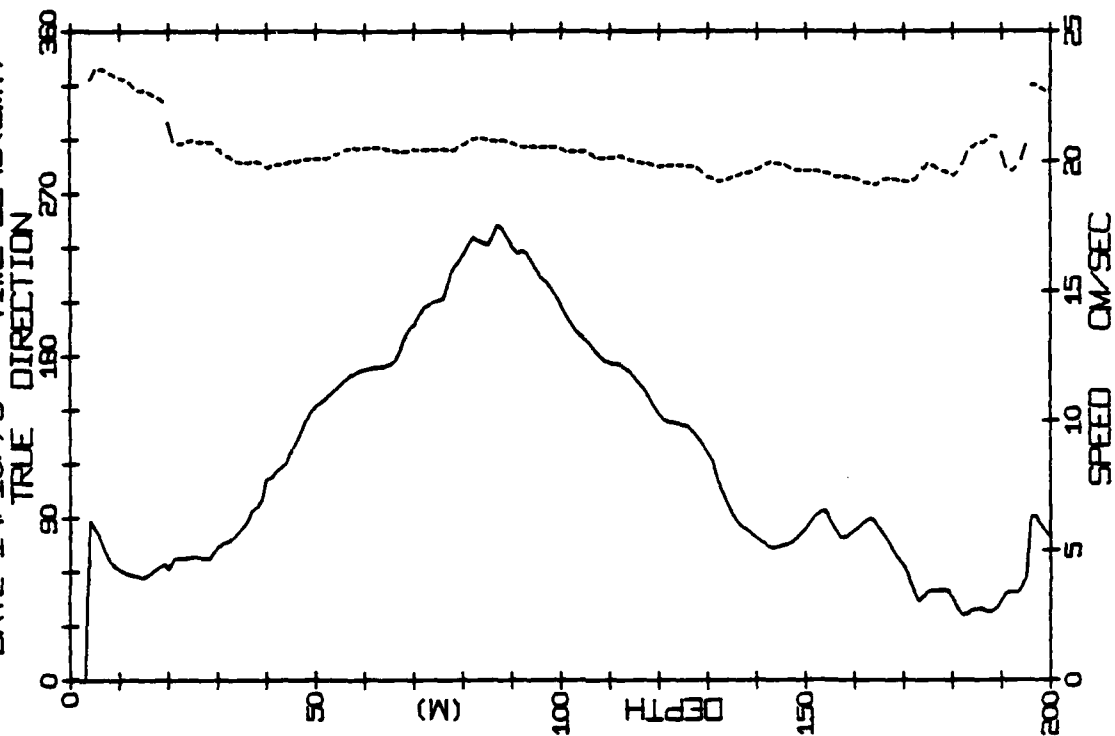
CAMP SNOWBIRD STATION 310
 DATE 13/10/75 TIME 2243(GMT)
 TRUE DIRECTION



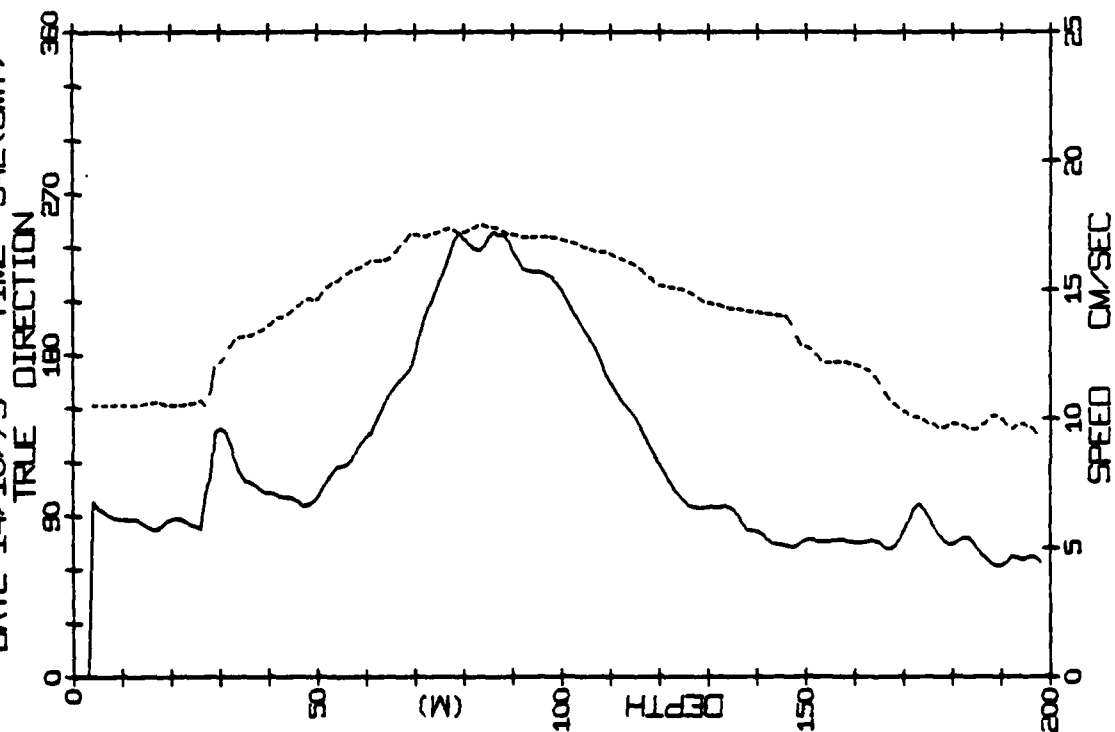
CAMP SNOWBIRD STATION 309
 DATE 13/10/75 TIME 543(GMT)
 TRUE DIRECTION



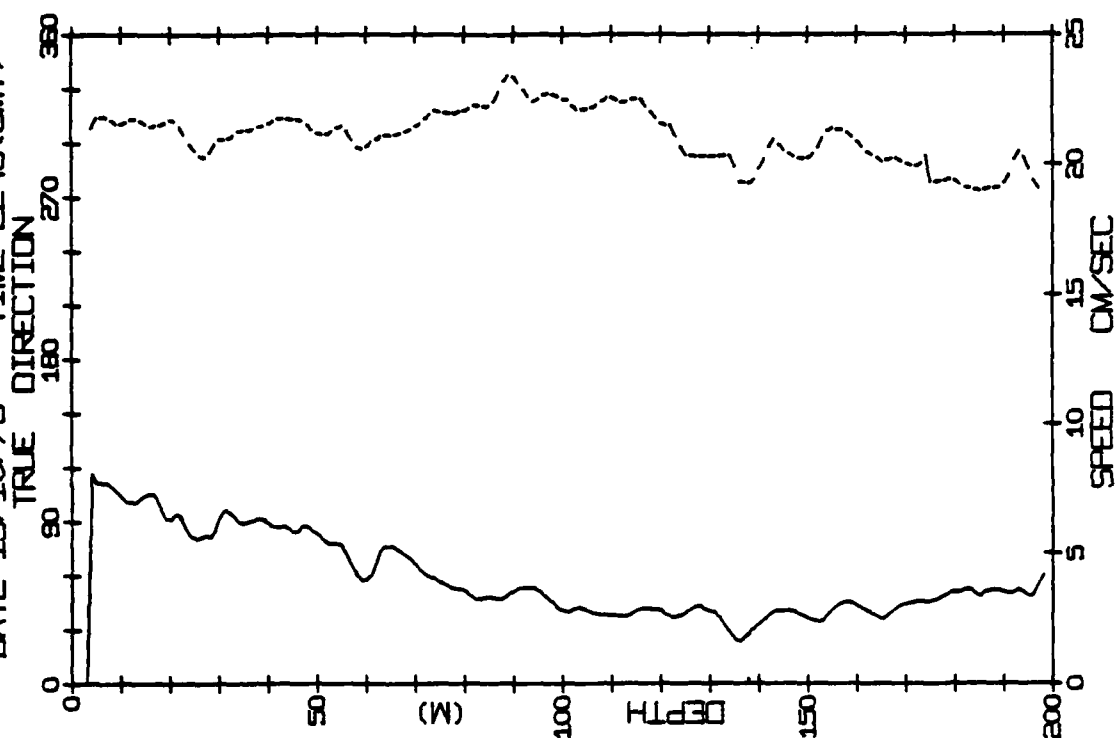
CAMP SNOWBIRD STATION 312
DATE 14/10/75 TIME 2243(GMT)



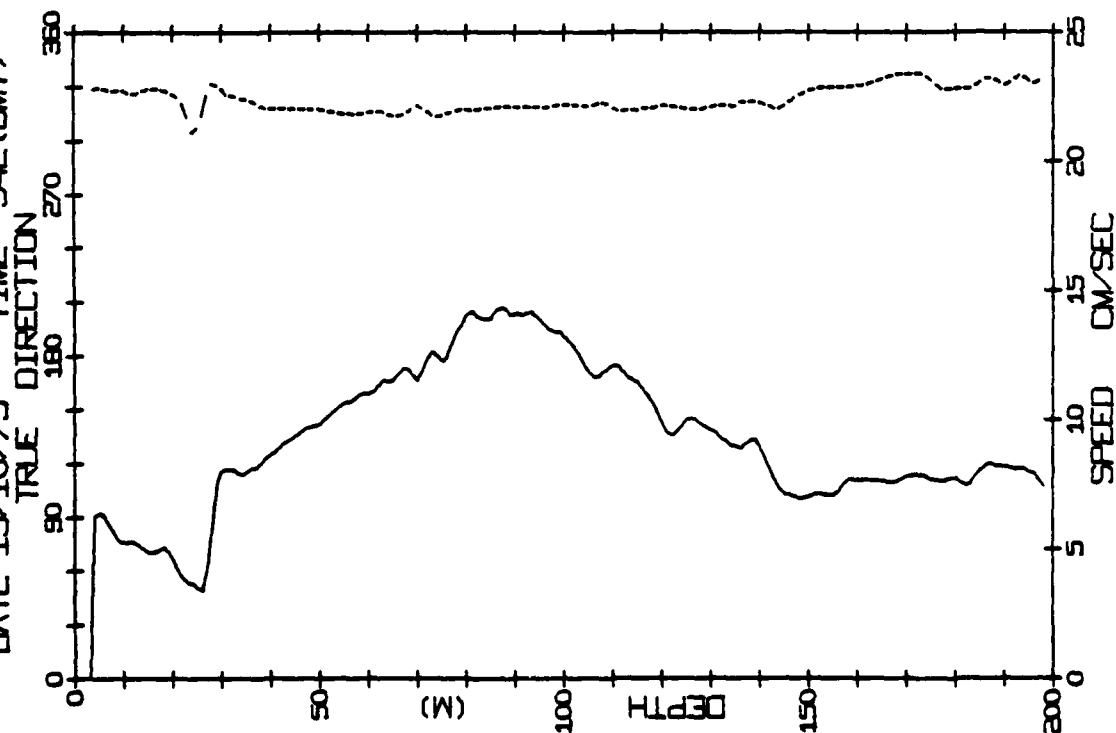
CAMP SNOWBIRD STATION 311
DATE 14/10/75 TIME 542(GMT)



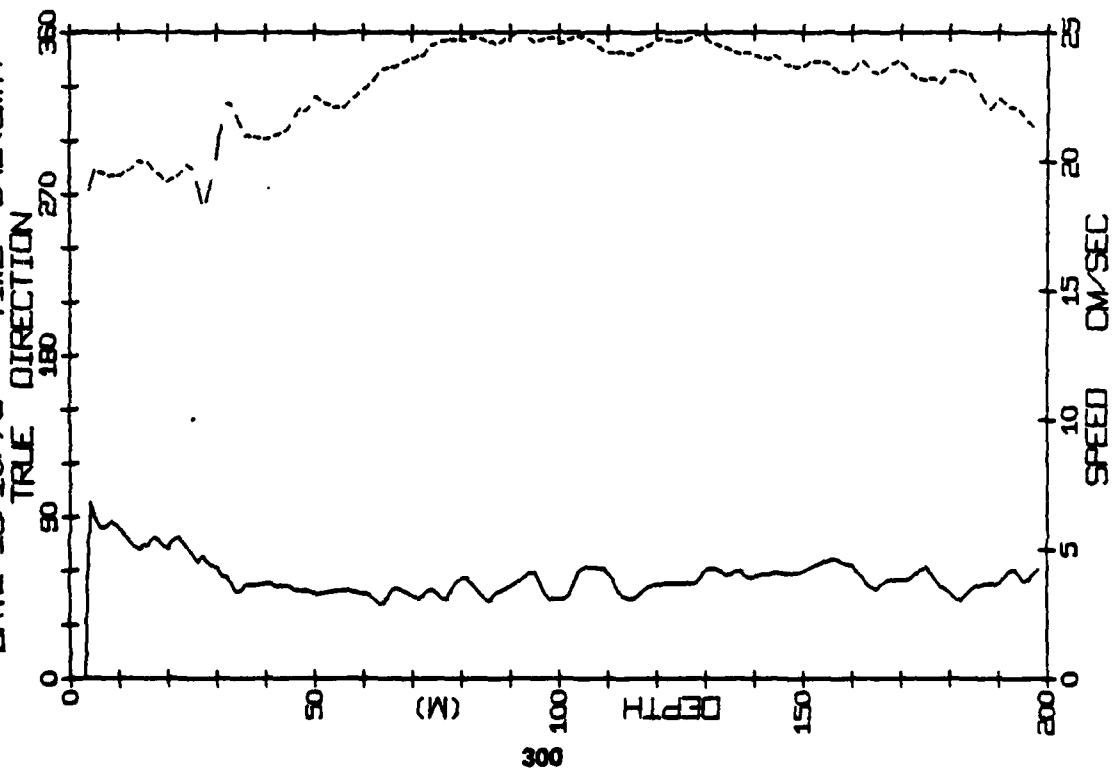
CAMP SNOWBIRD STATION 314
DATE 15/10/75 TIME 2243(GMT)



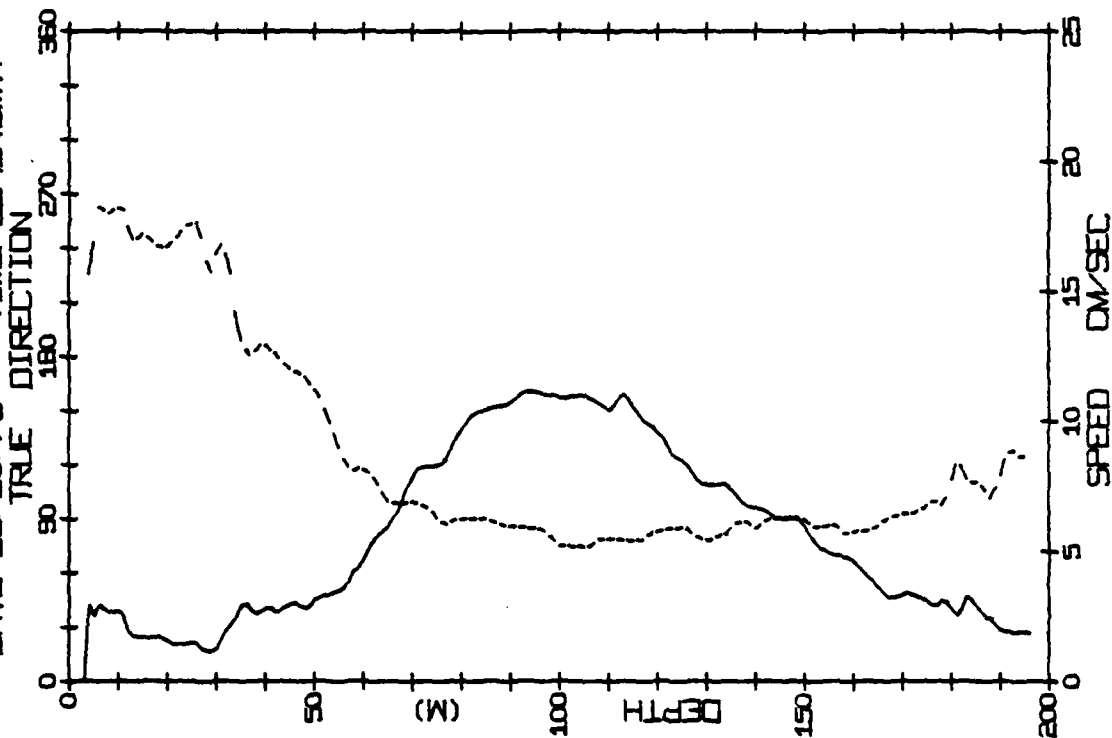
CAMP SNOWBIRD STATION 313
DATE 15/10/75 TIME 542(GMT)

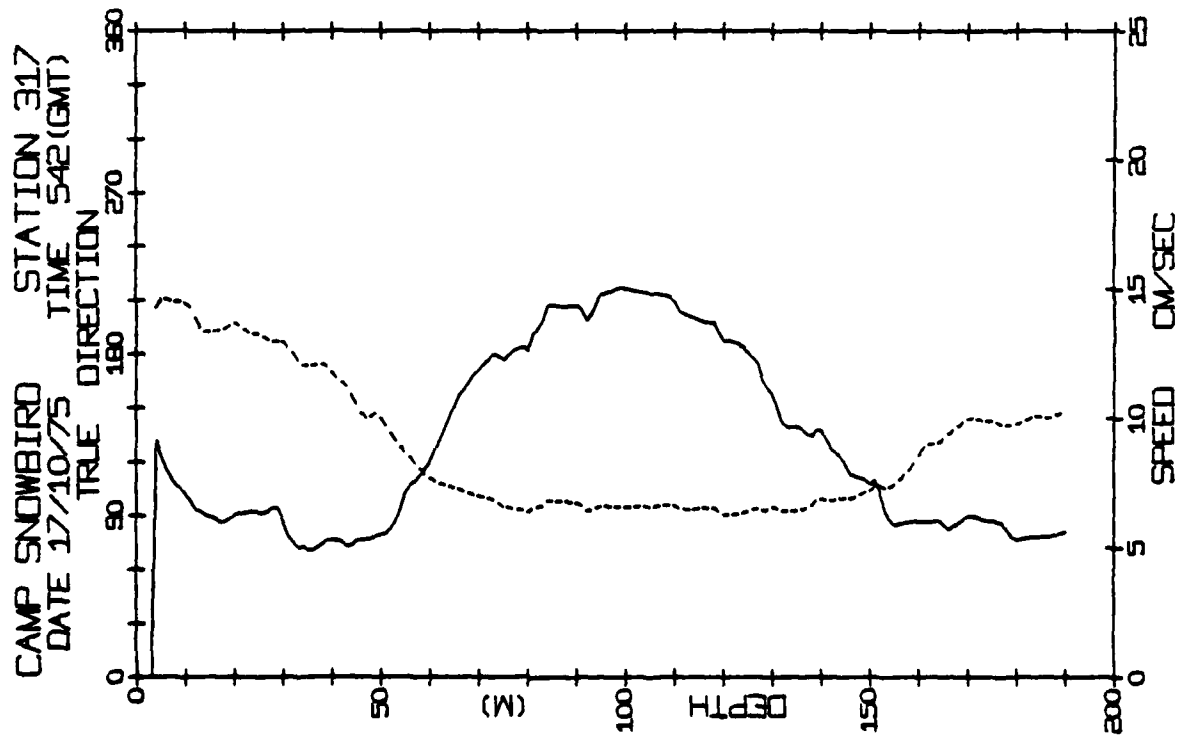
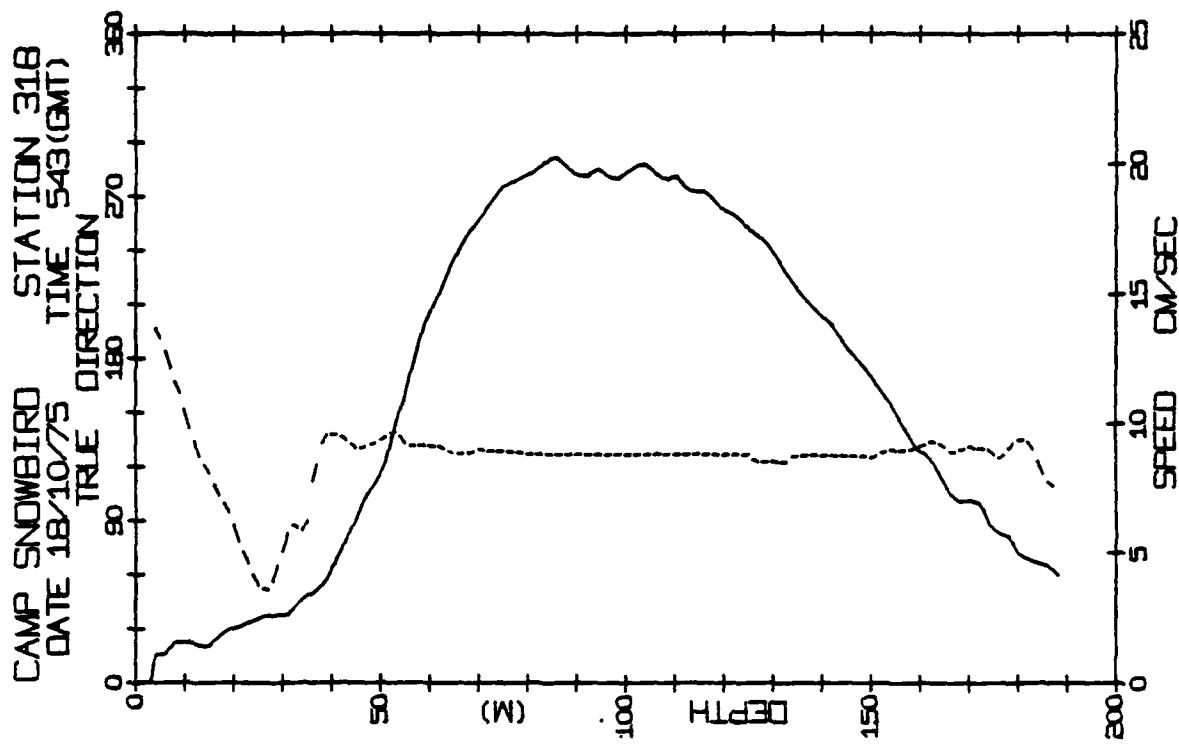


CAMP SNOWBIRD STATION 315
DATE 16/10/75 TIME 542(GMT)

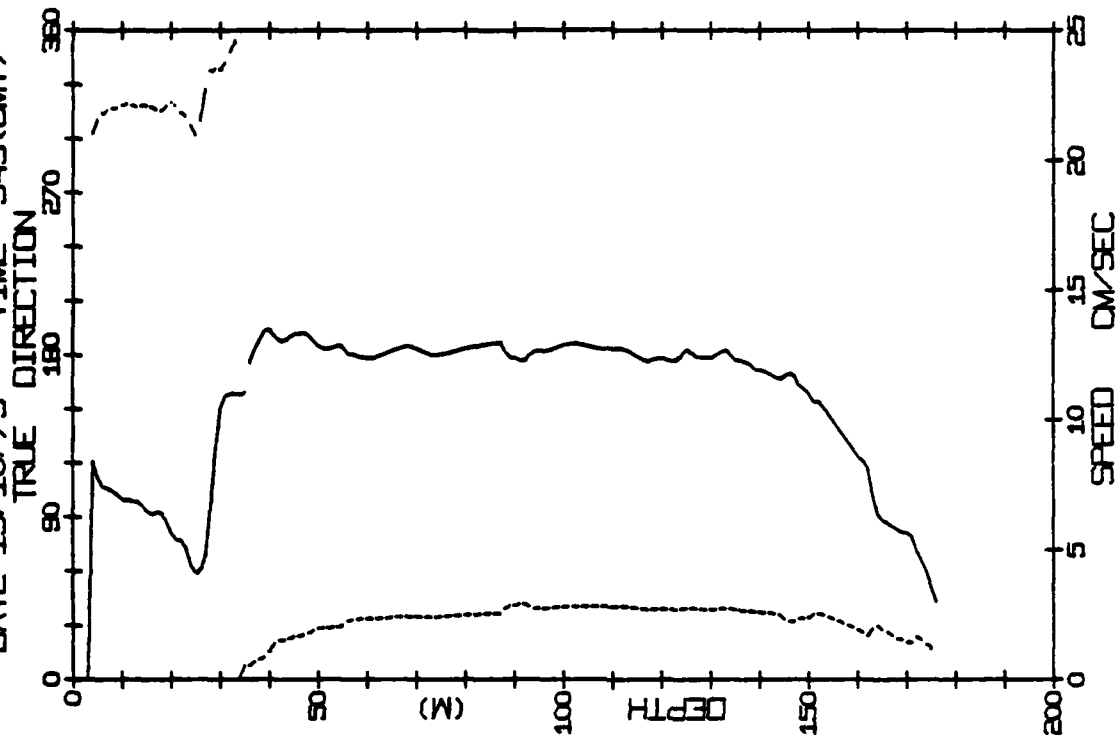


CAMP SNOWBIRD STATION 316
DATE 16/10/75 TIME 2242(GMT)

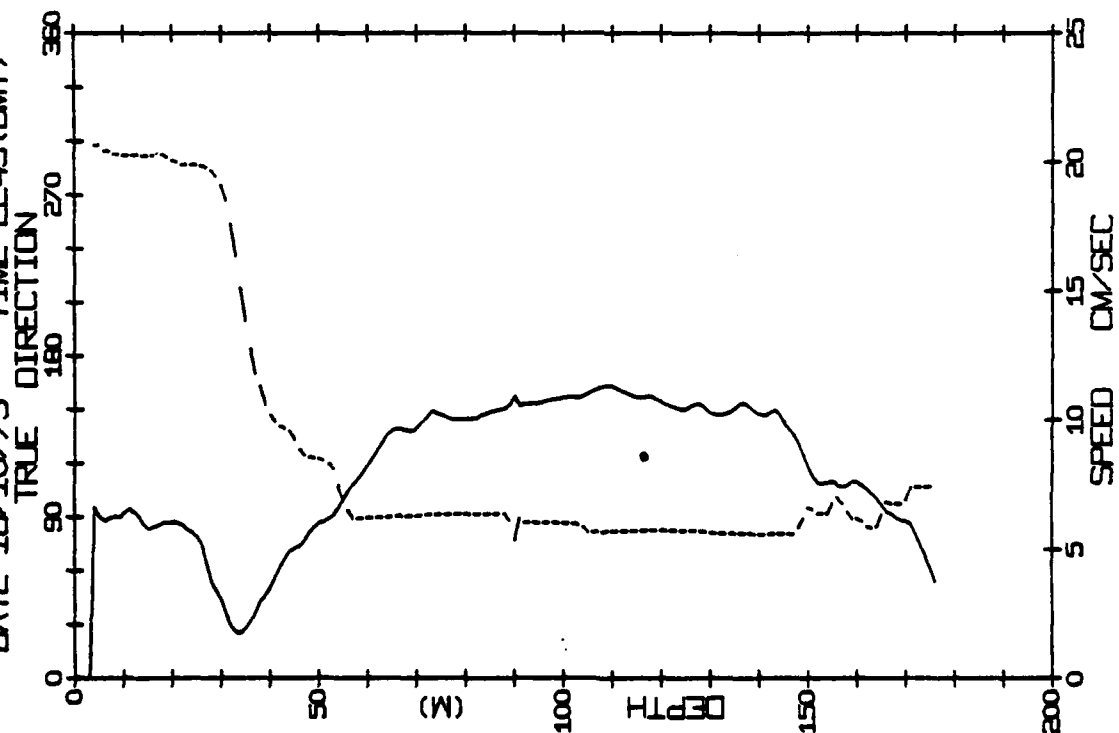


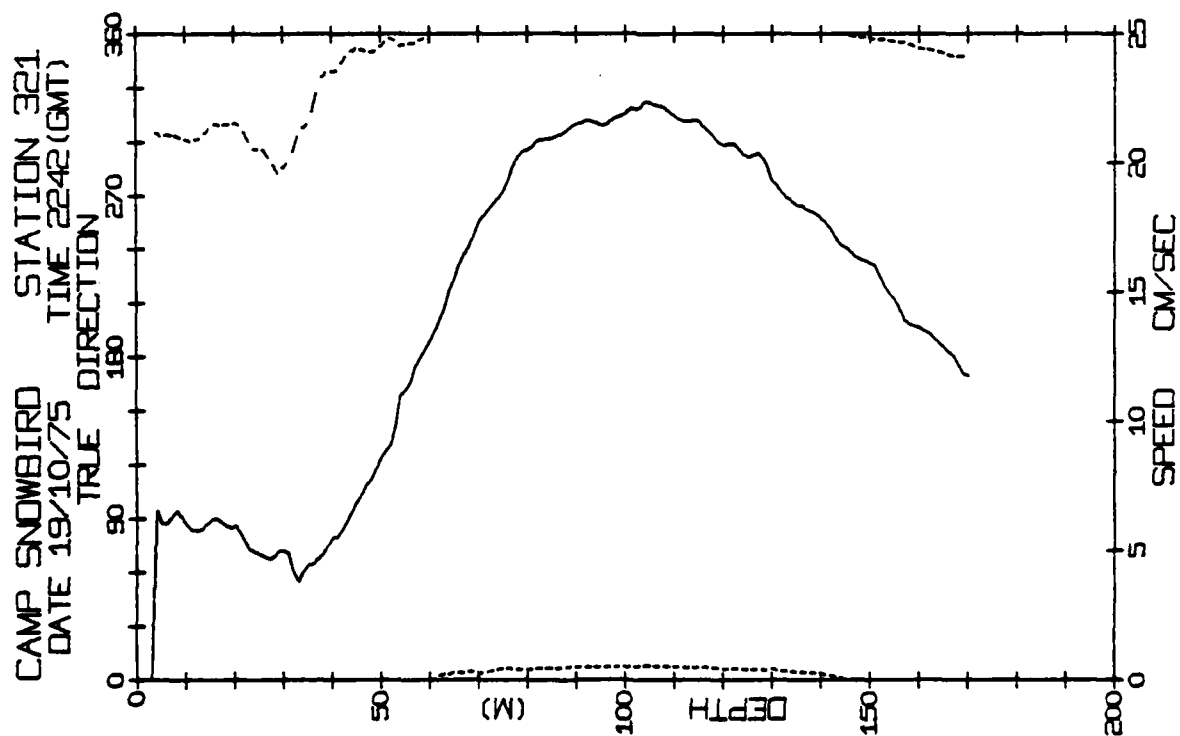
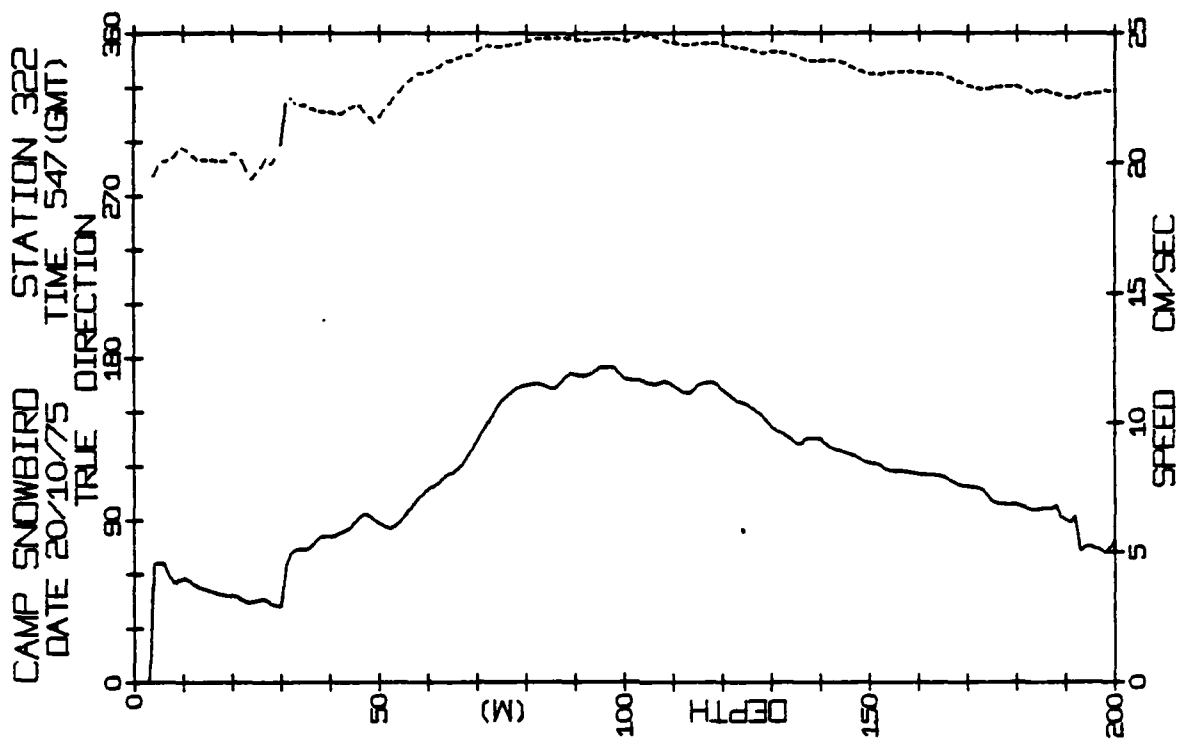


CAMP SNOWBIRD STATION 320
DATE 19/10/75 TIME 543(GMT)

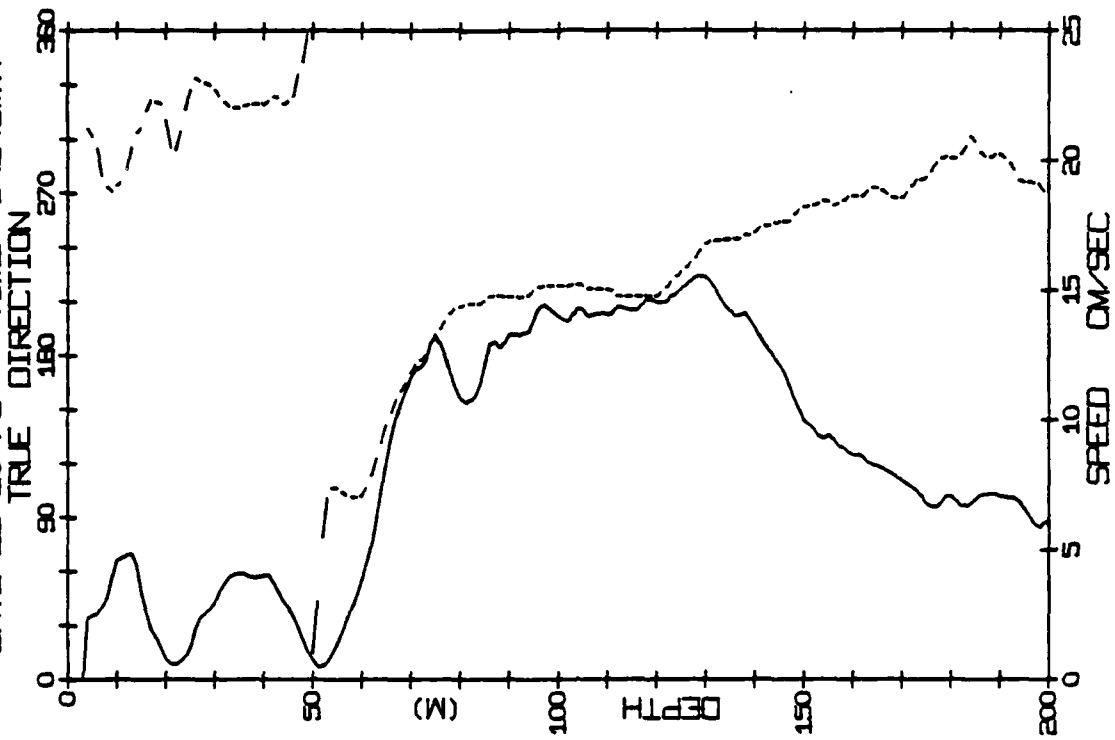


CAMP SNOWBIRD STATION 319
DATE 18/10/75 TIME 2243(GMT)

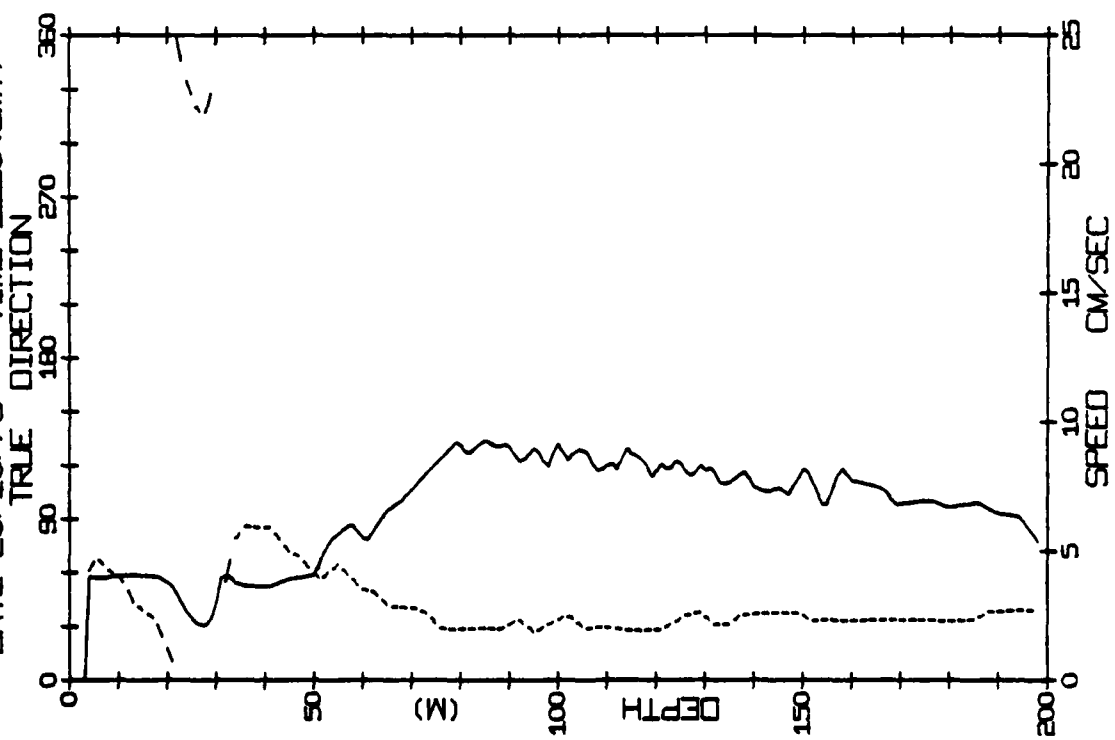




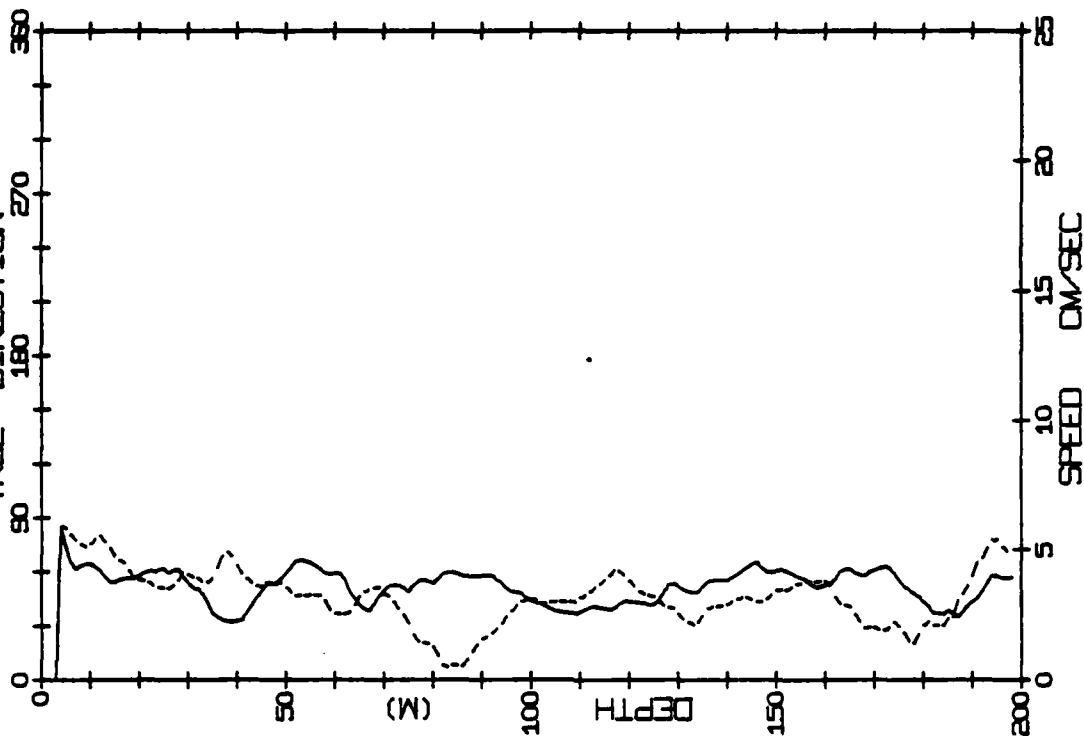
CAMP SNOWBIRD STATION 324
 DATE 21/10/75 TIME 542 (GMT)



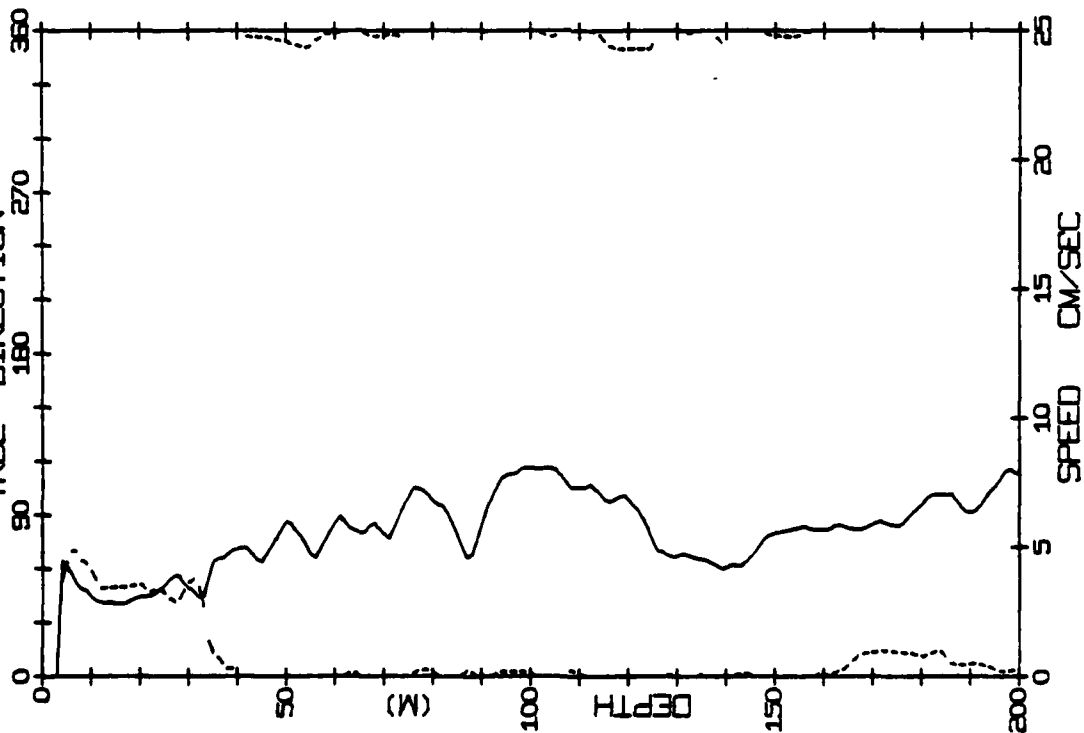
CAMP SNOWBIRD STATION 323
 DATE 20/10/75 TIME 2220 (GMT)

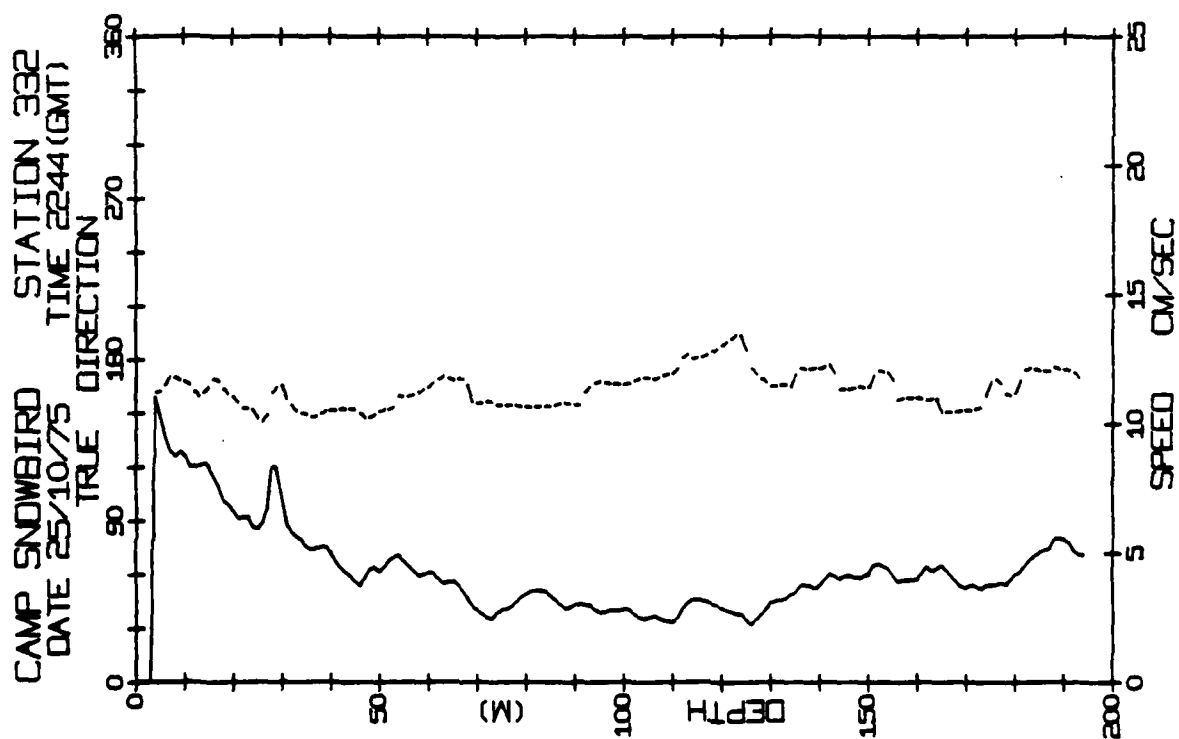
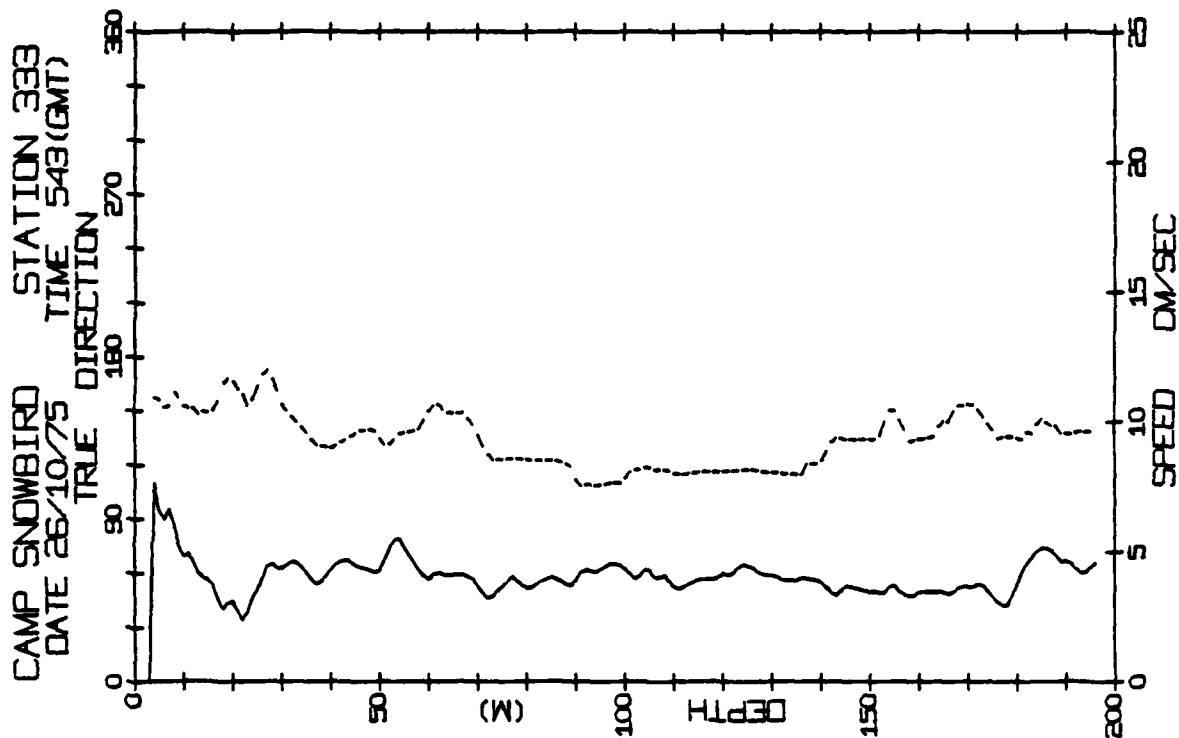


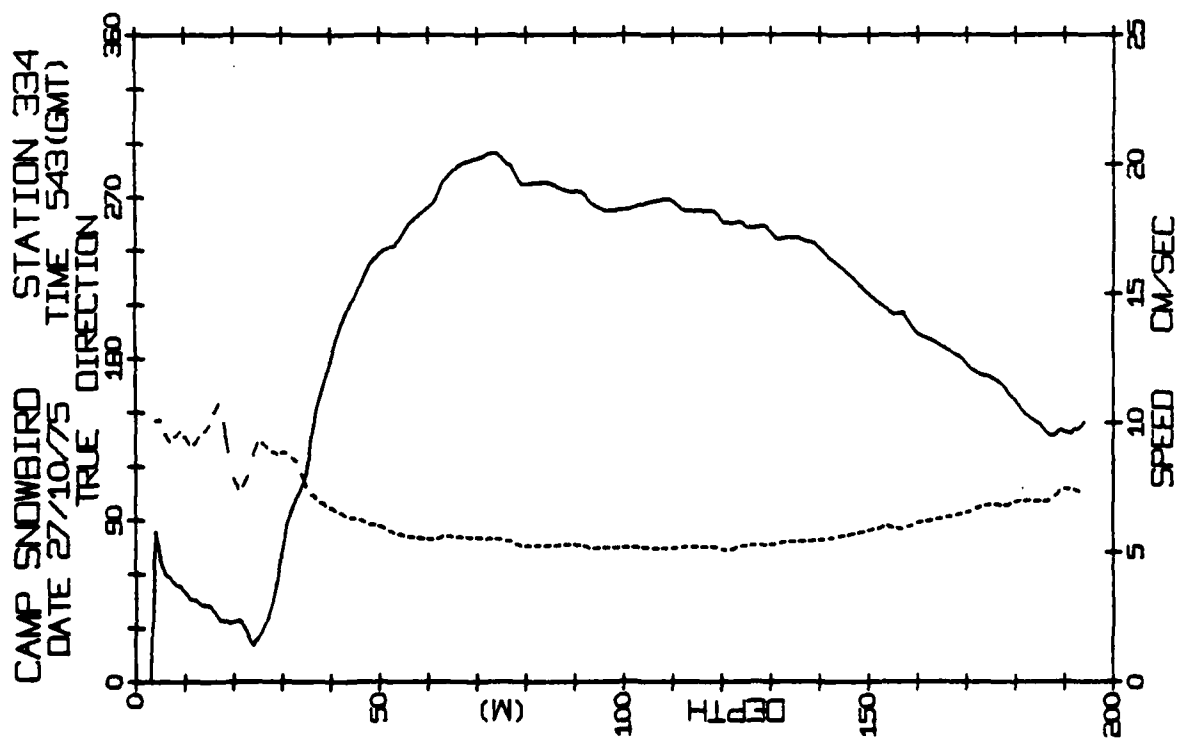
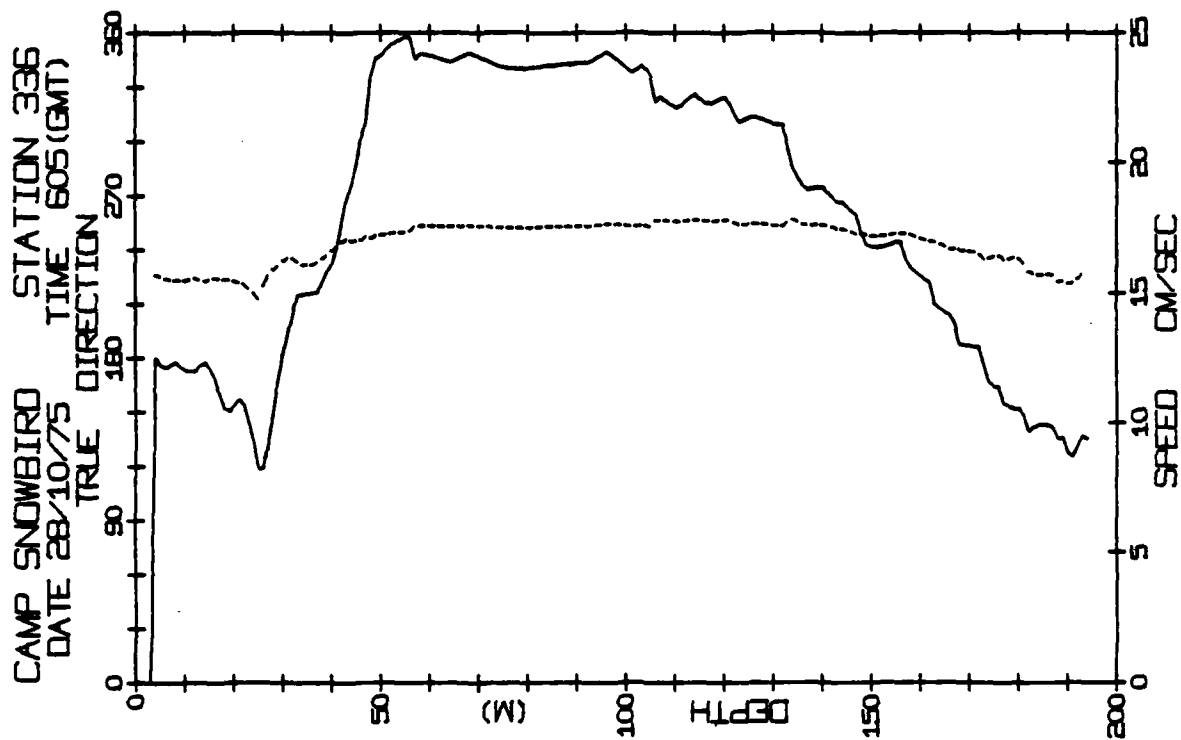
CAMP SNOWBIRD STATION 331
 DATE 25/10/75 TIME 542 (GMT)
 TRUE DIRECTION



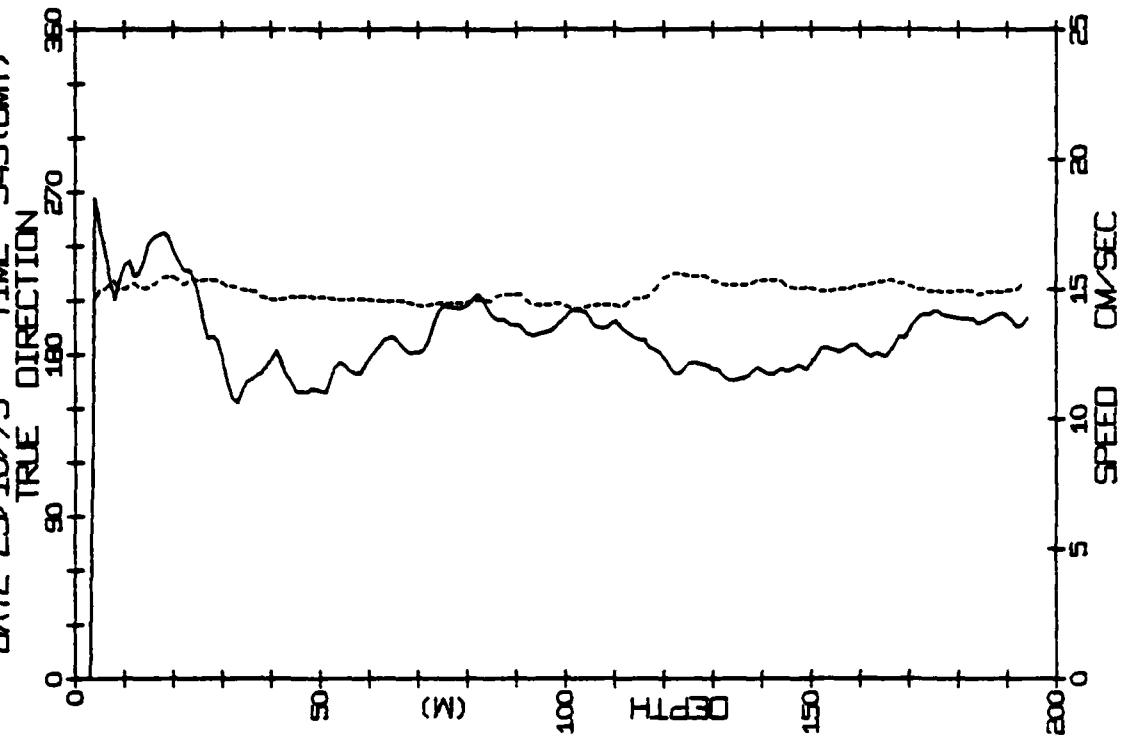
CAMP SNOWBIRD STATION 330
 DATE 24/10/75 TIME 2247 (GMT)
 TRUE DIRECTION



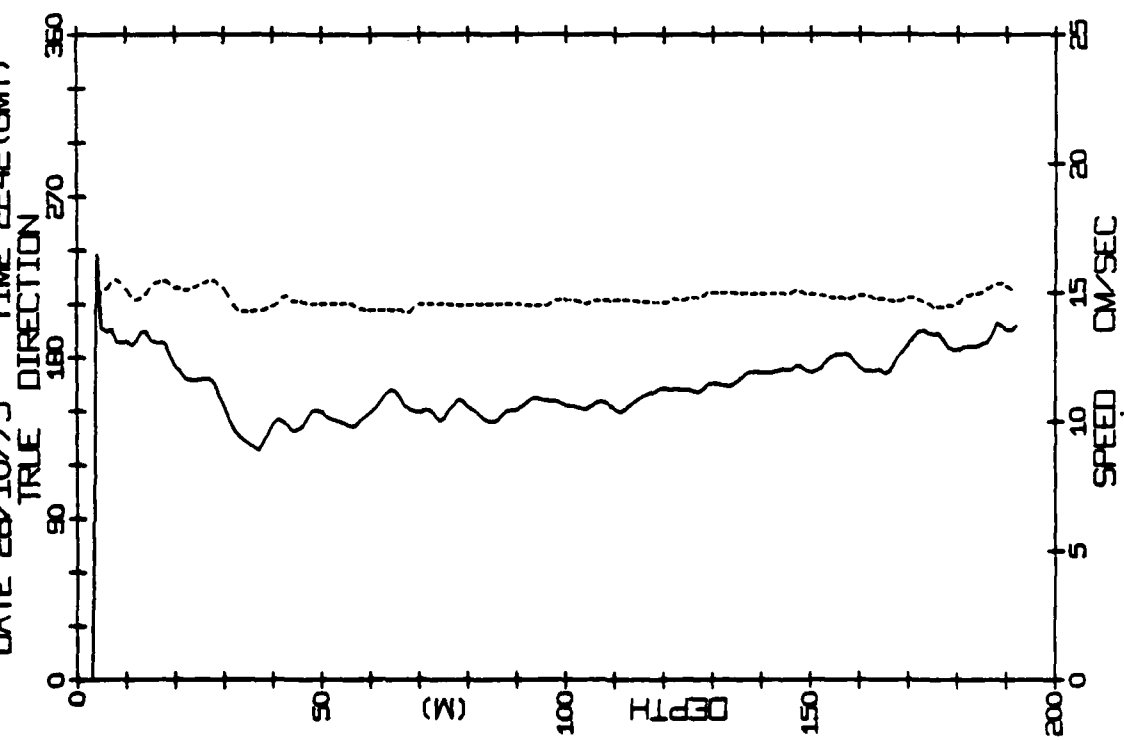


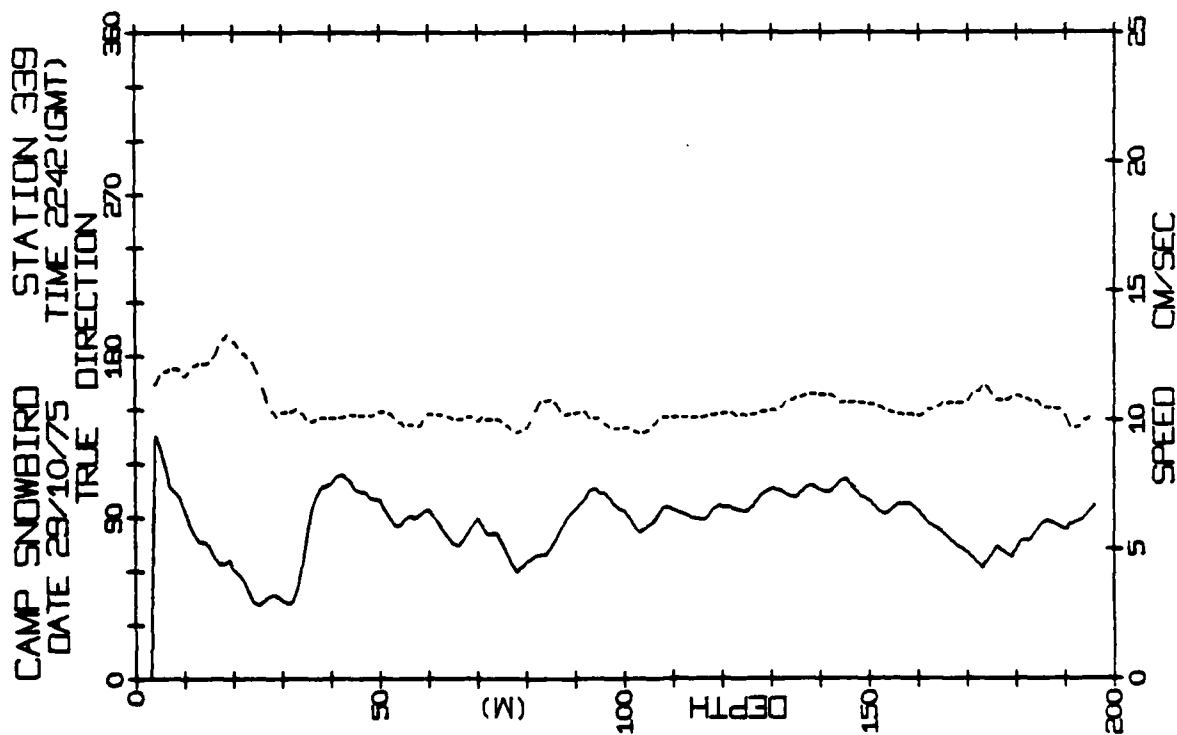
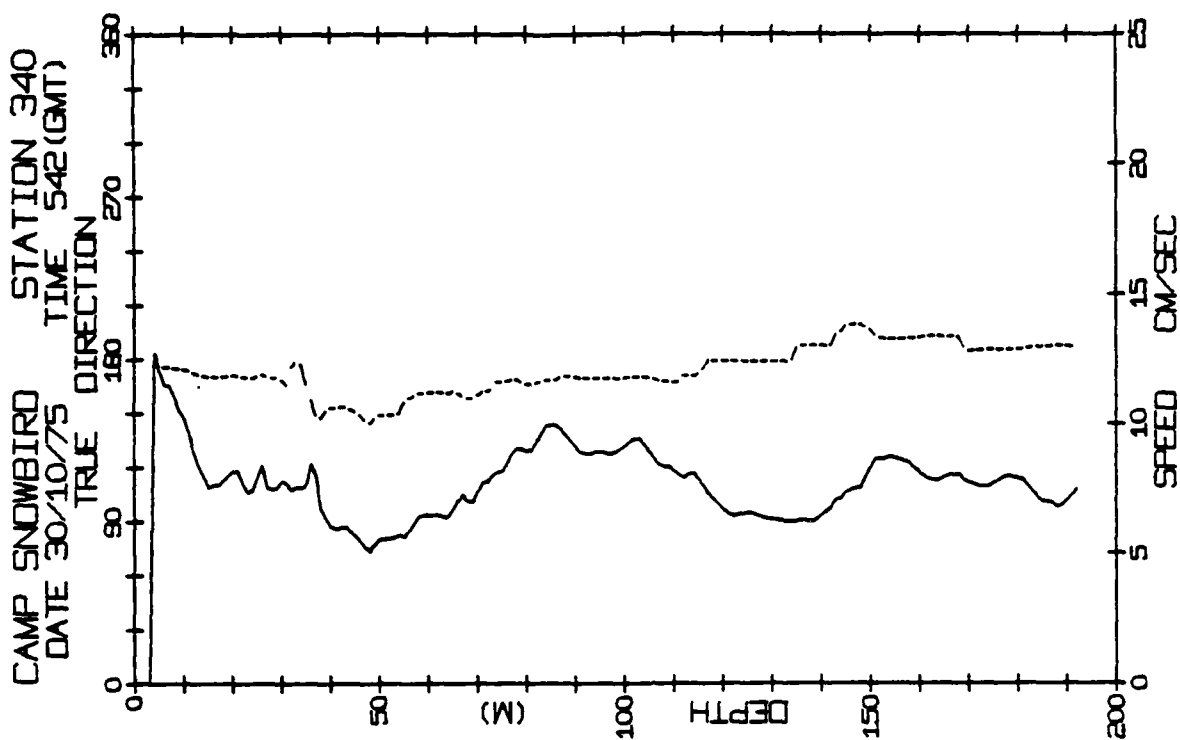


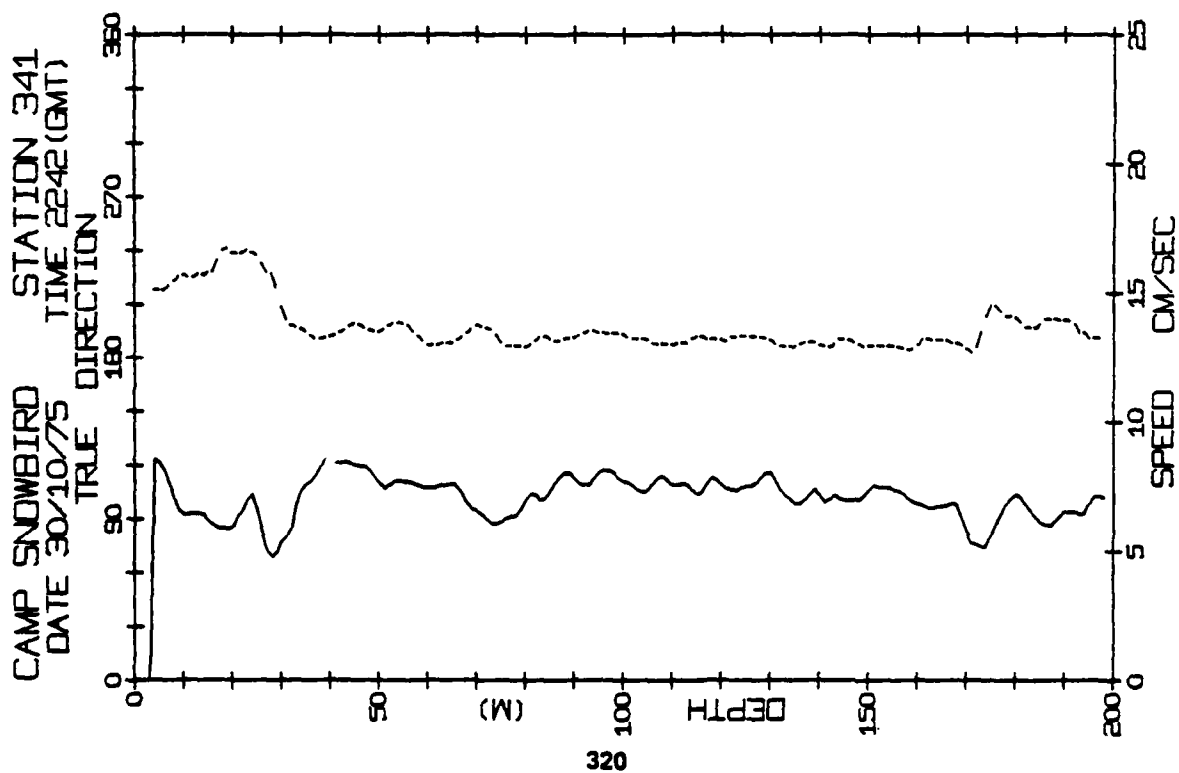
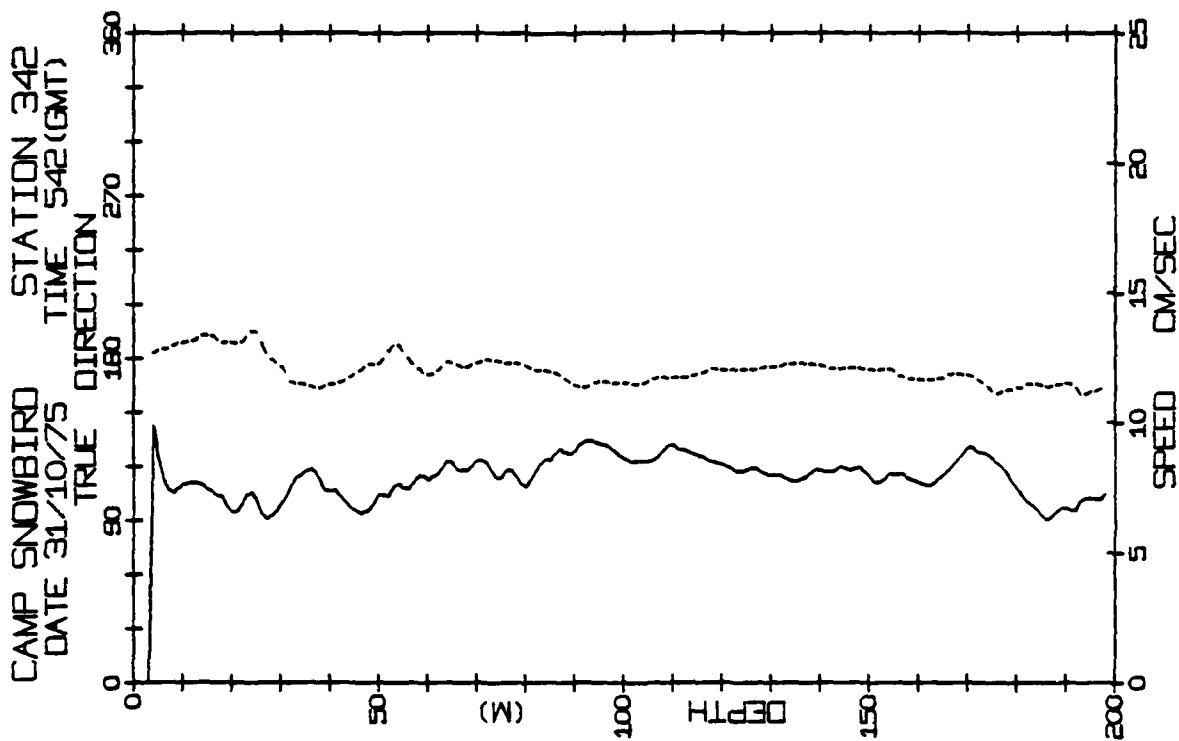
CAMP SNOWBIRD STATION 338
DATE 29/10/75 TIME 543(GMT)

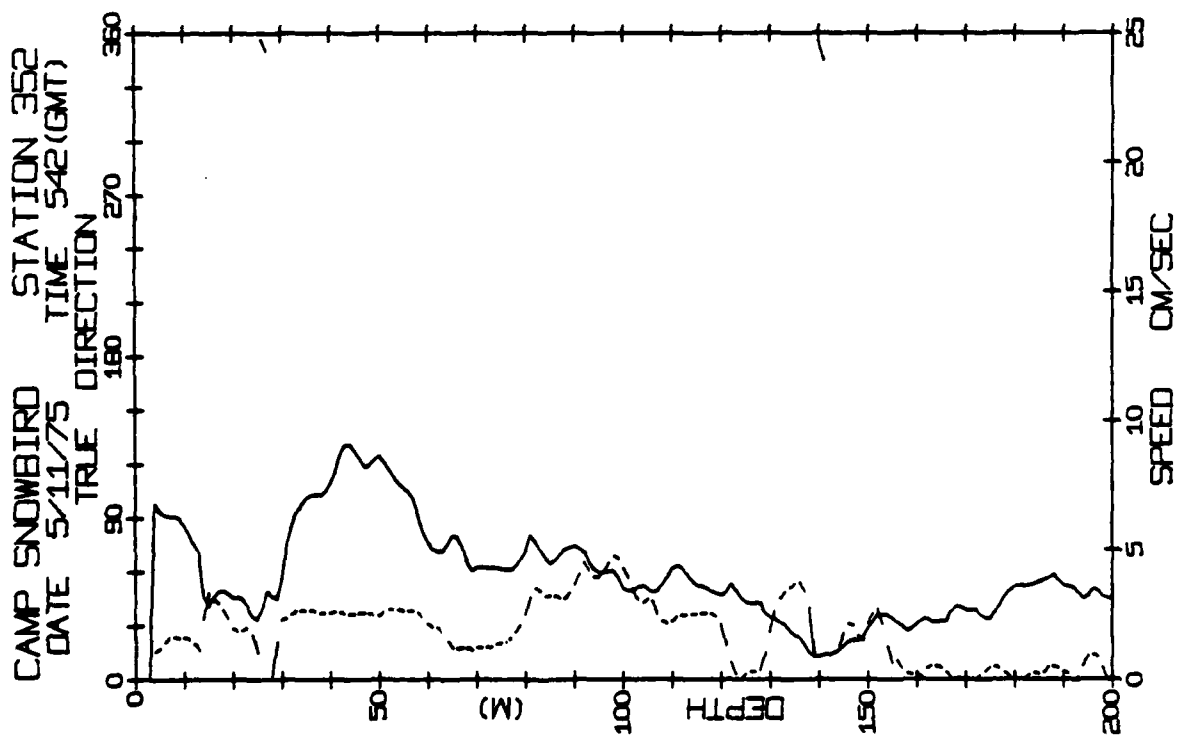
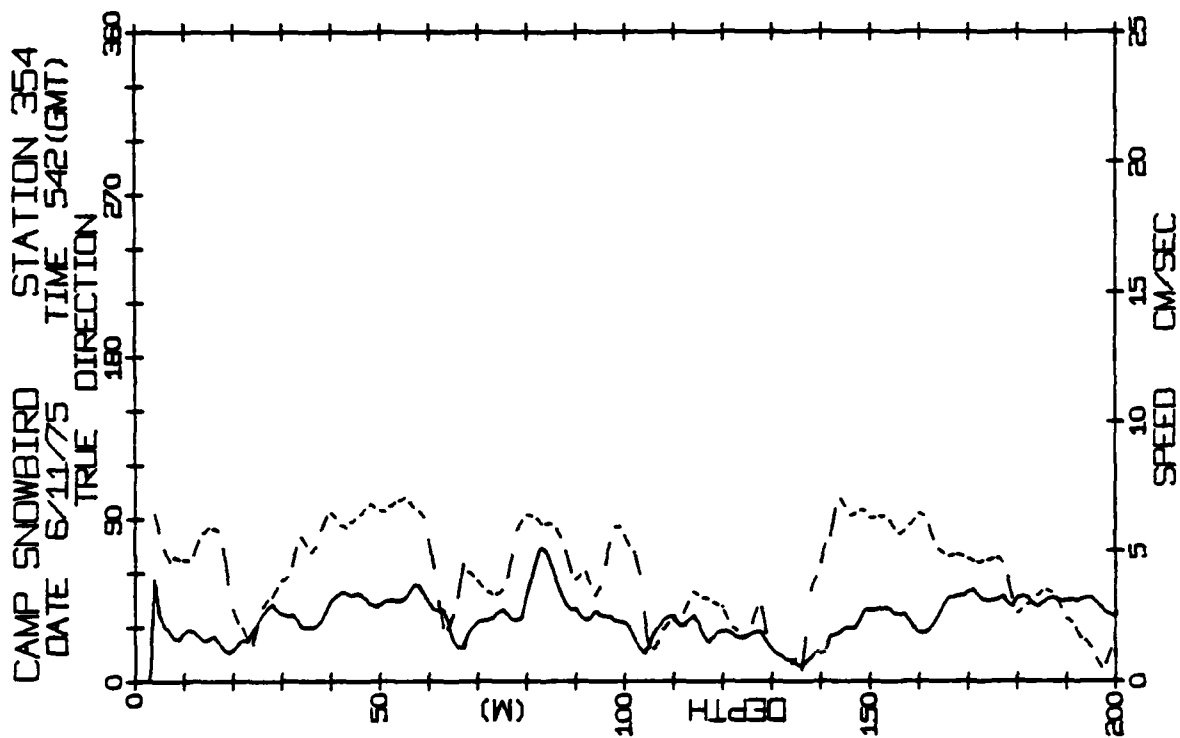


CAMP SNOWBIRD STATION 337
DATE 28/10/75 TIME 2242(GMT)

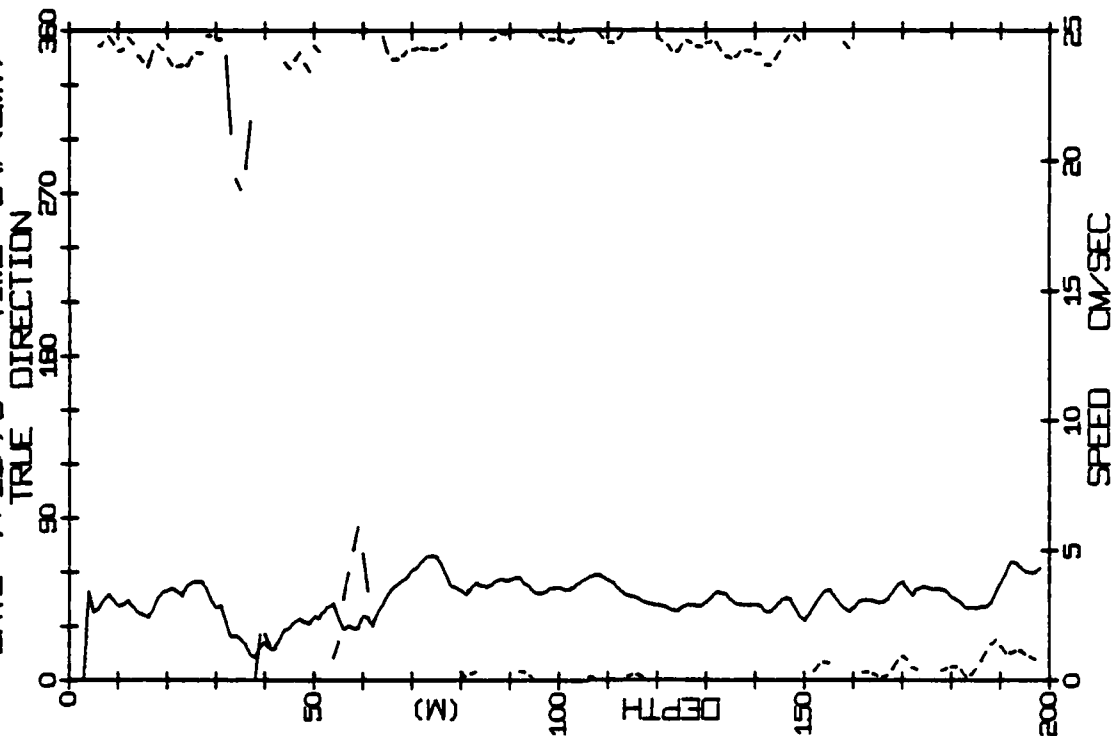




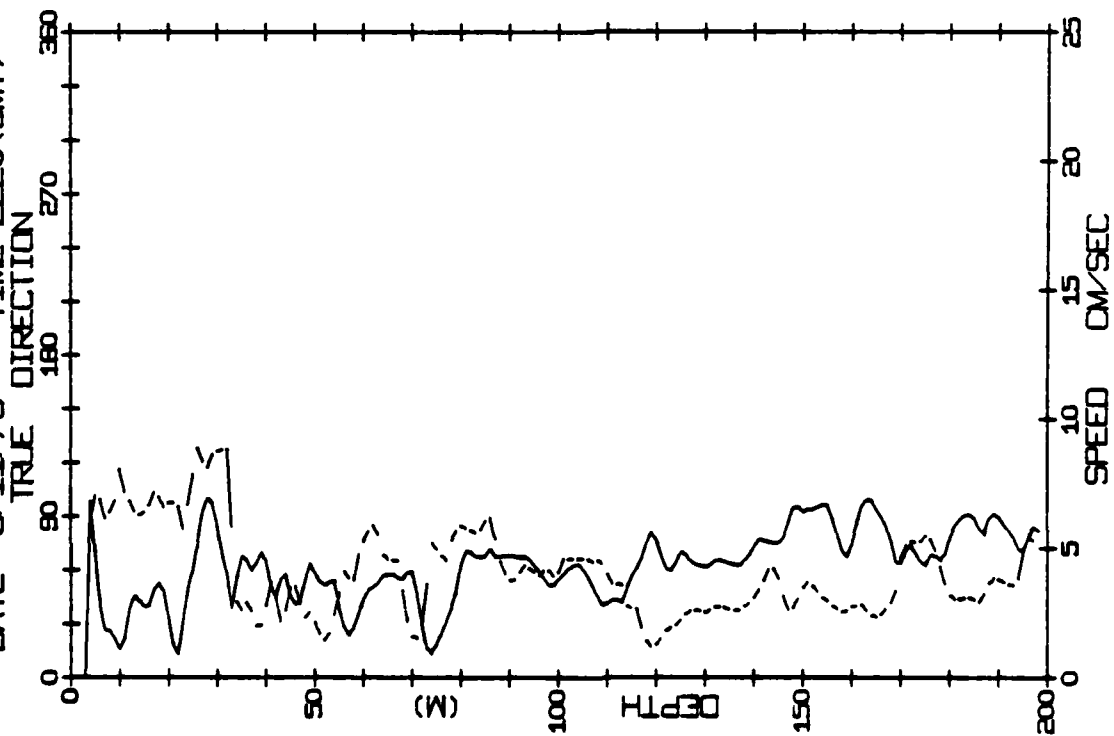


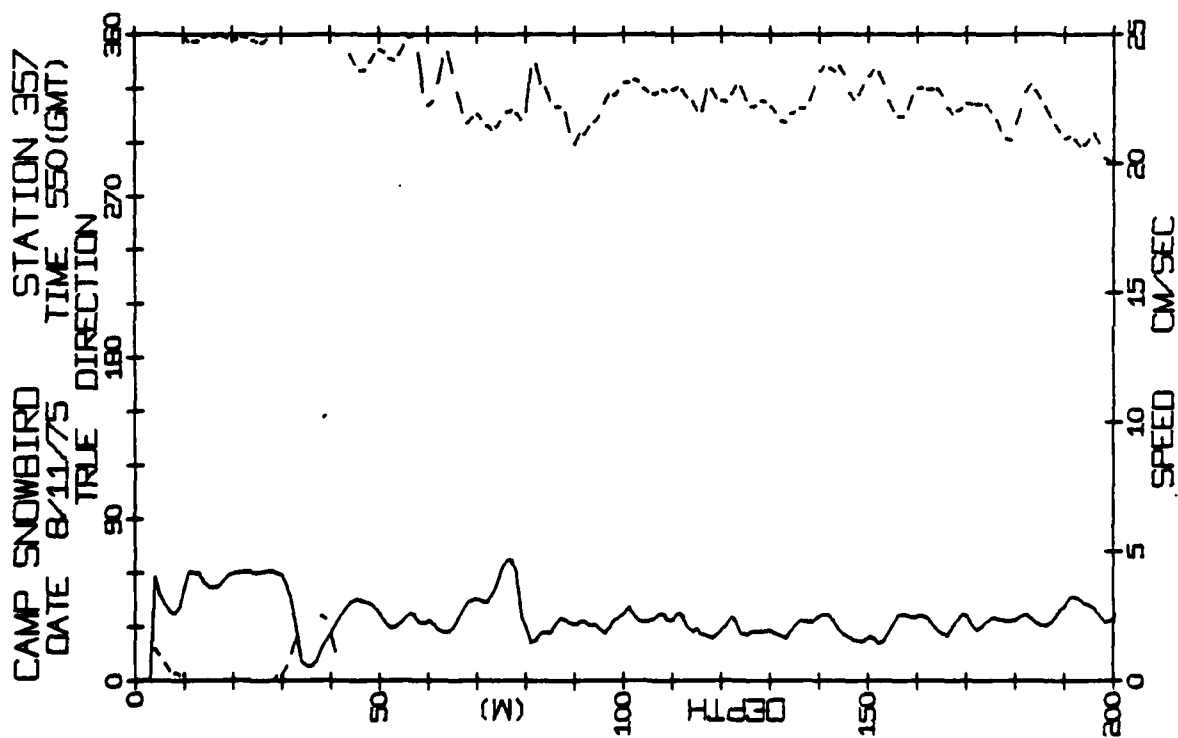
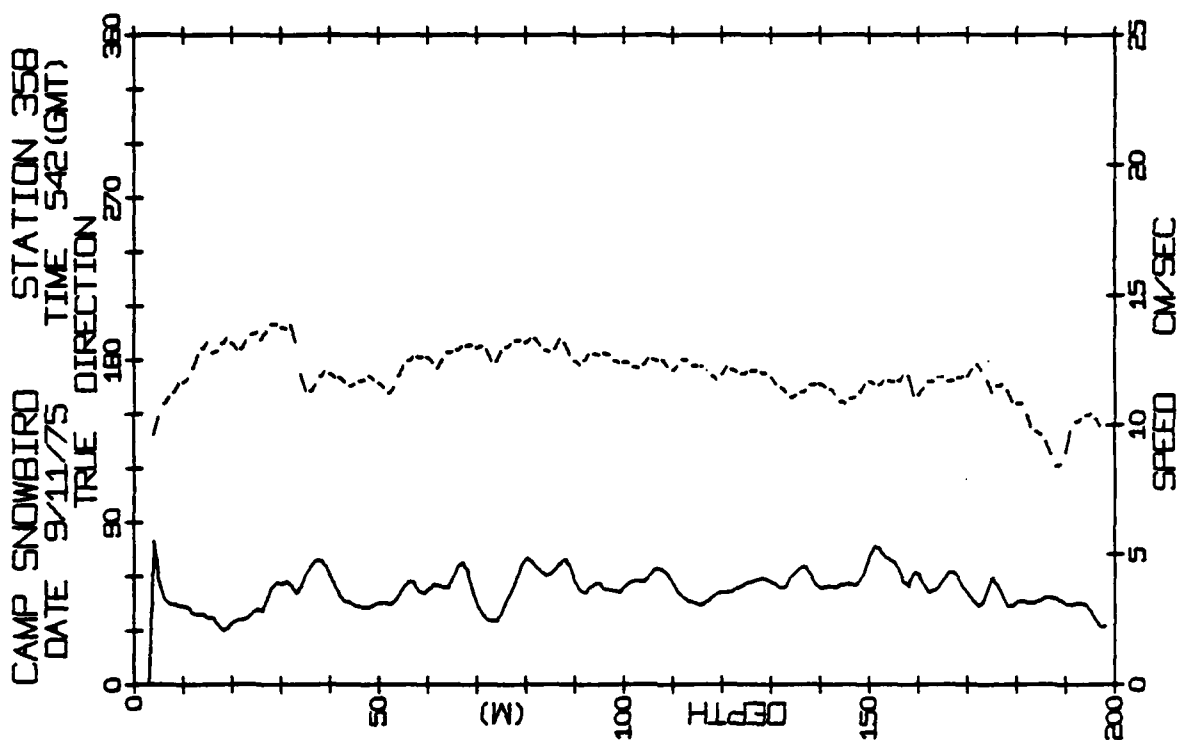


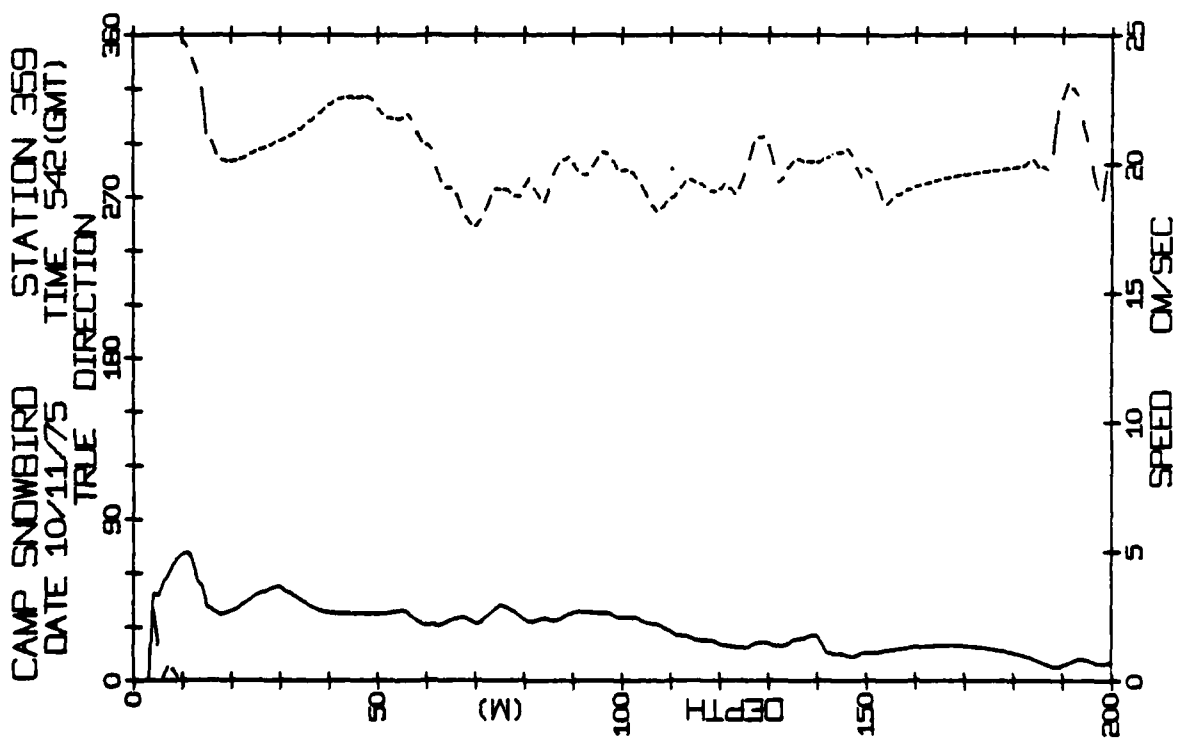
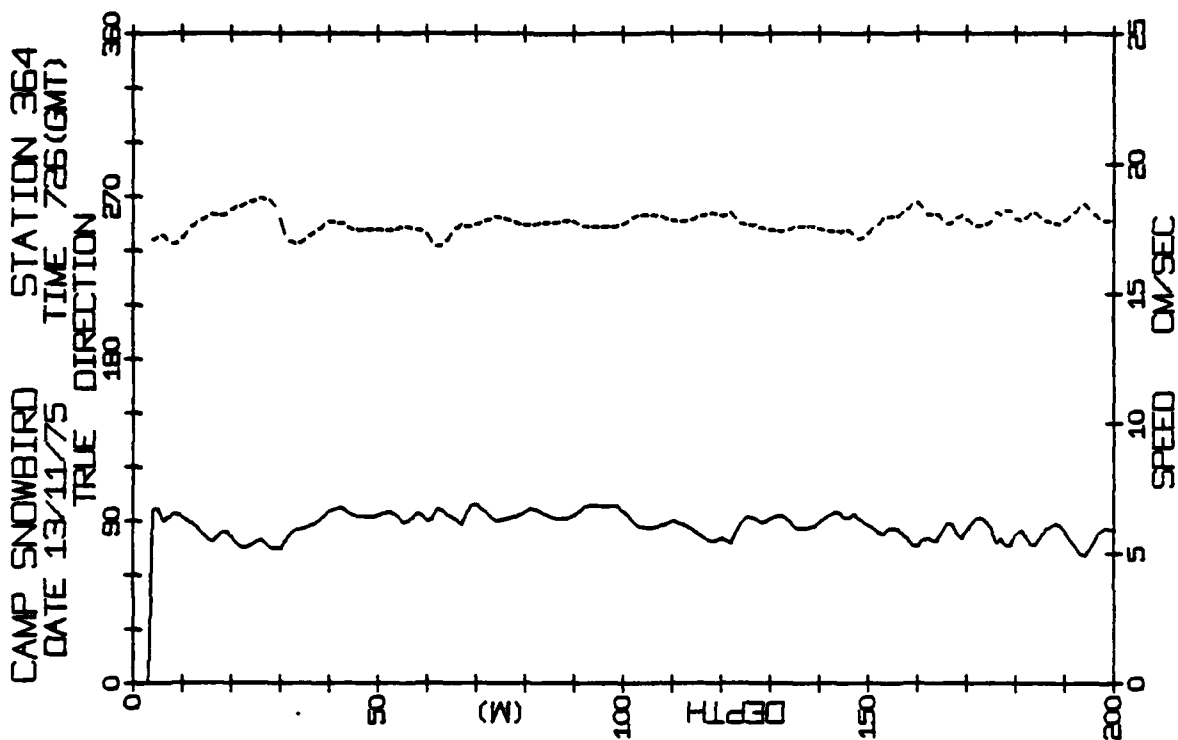
CAMP SNOWBIRD STATION 356
DATE 7/11/75 TIME 547 (GMT)



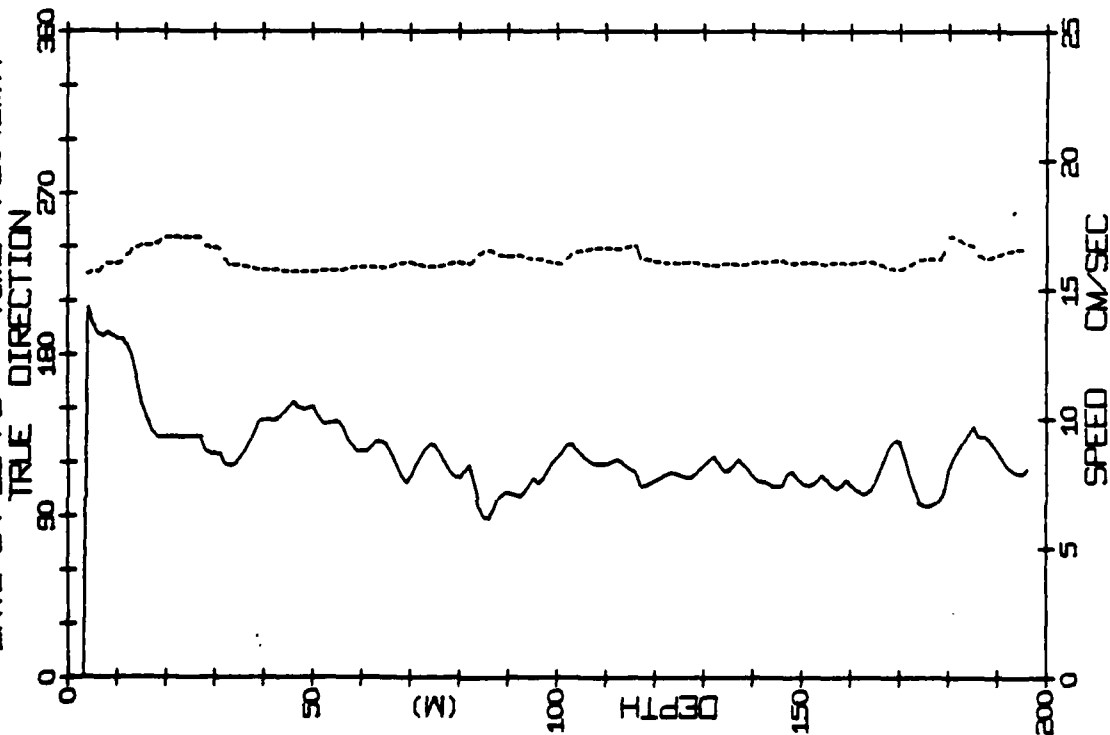
CAMP SNOWBIRD STATION 355
DATE 6/11/75 TIME 2220 (GMT)



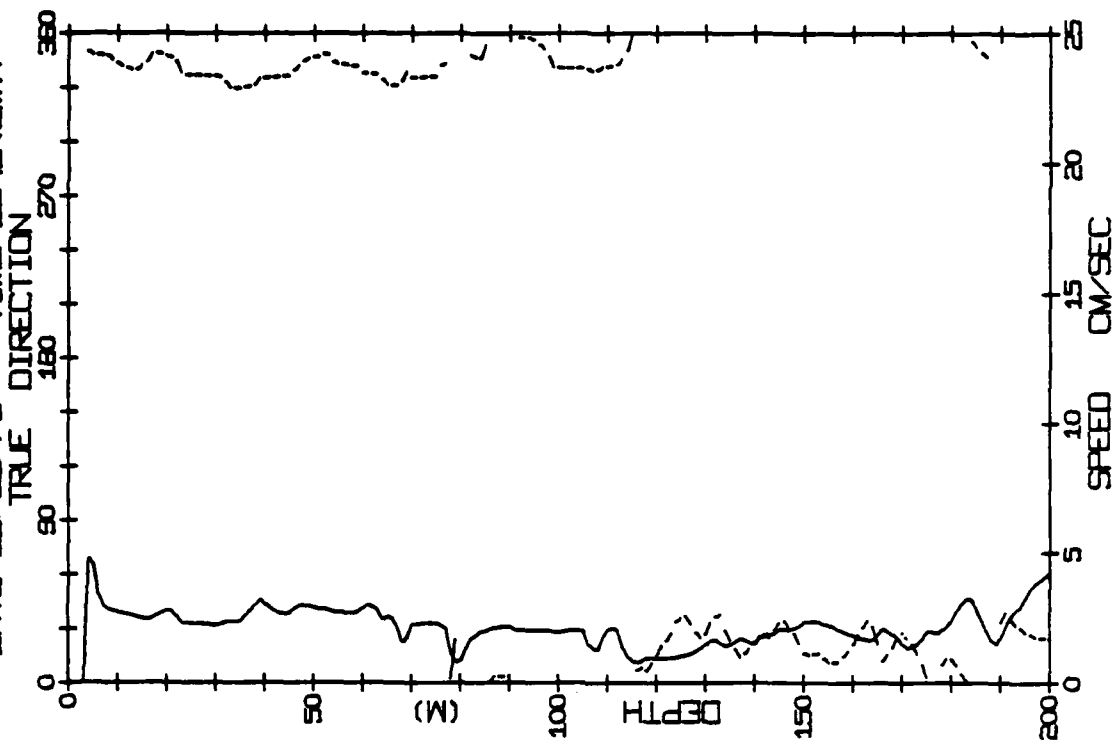


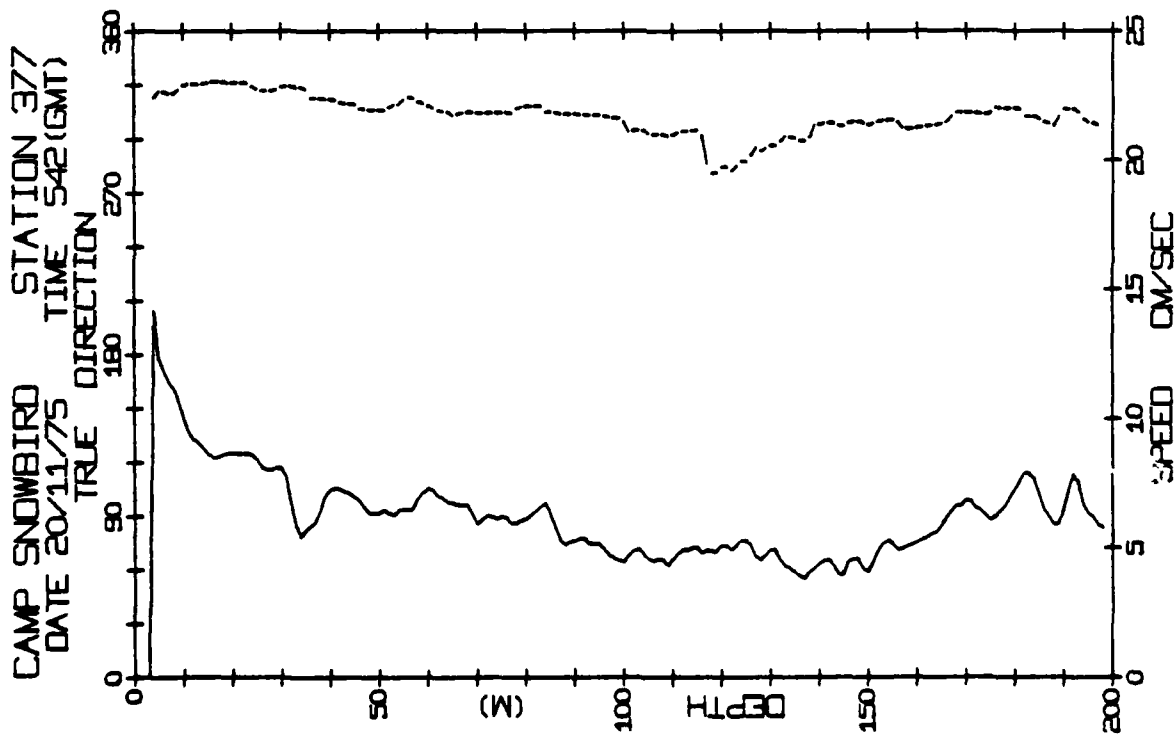
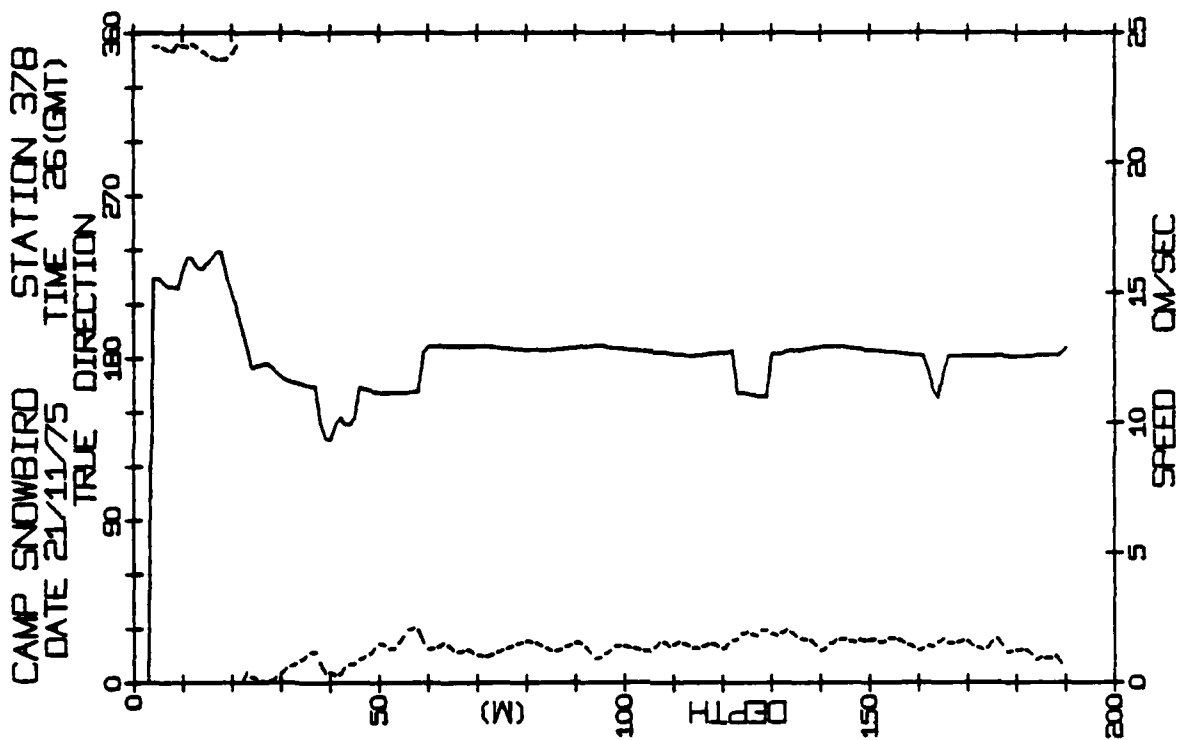


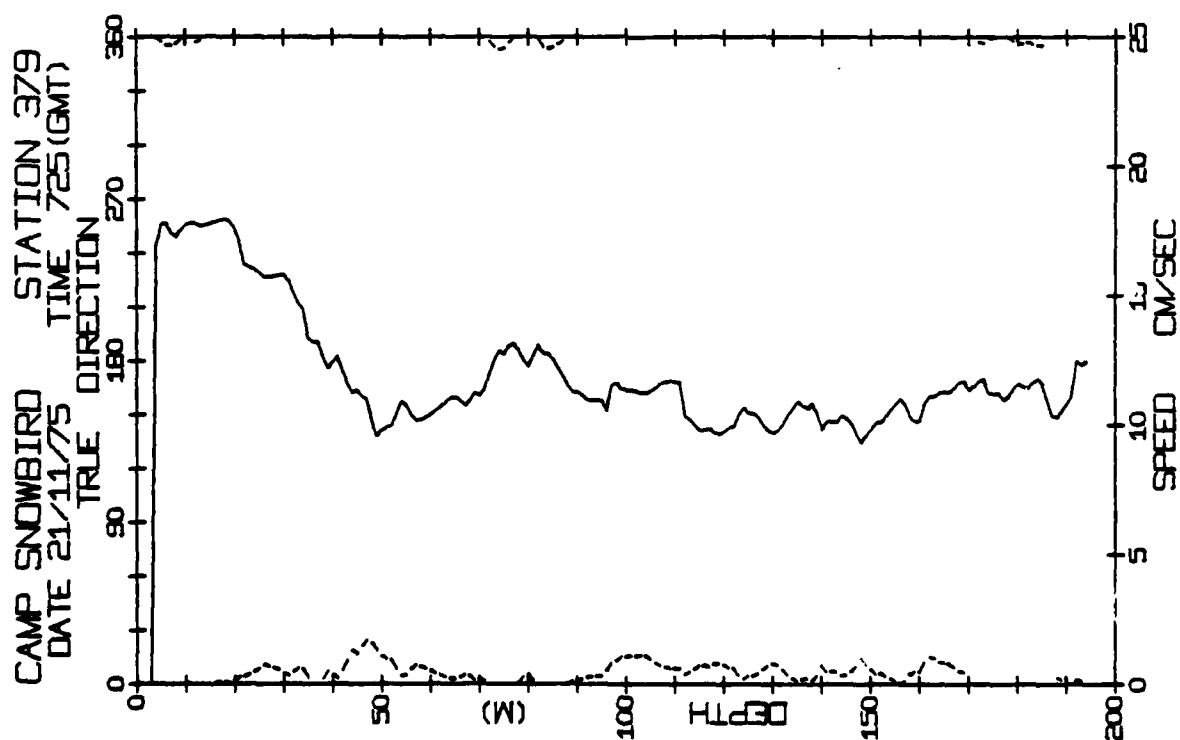
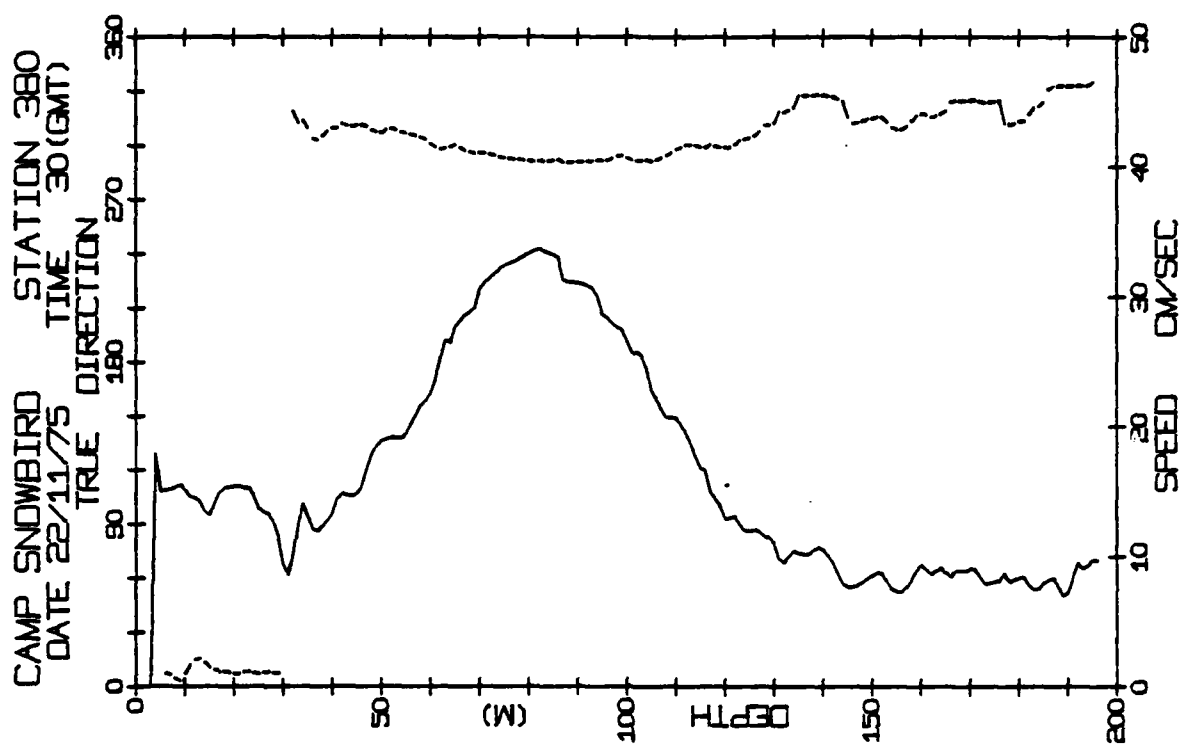
CAMP SNOWBIRD STATION 365
DATE 14/11/75 TIME 710 (GMT)

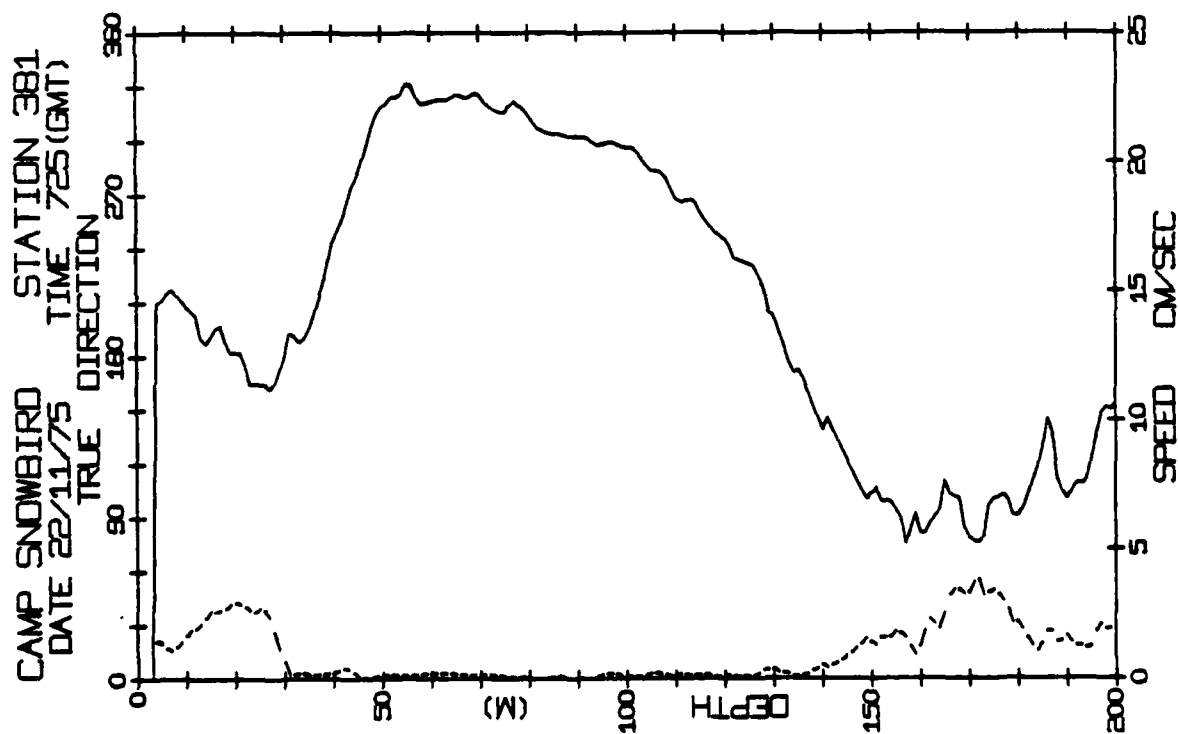
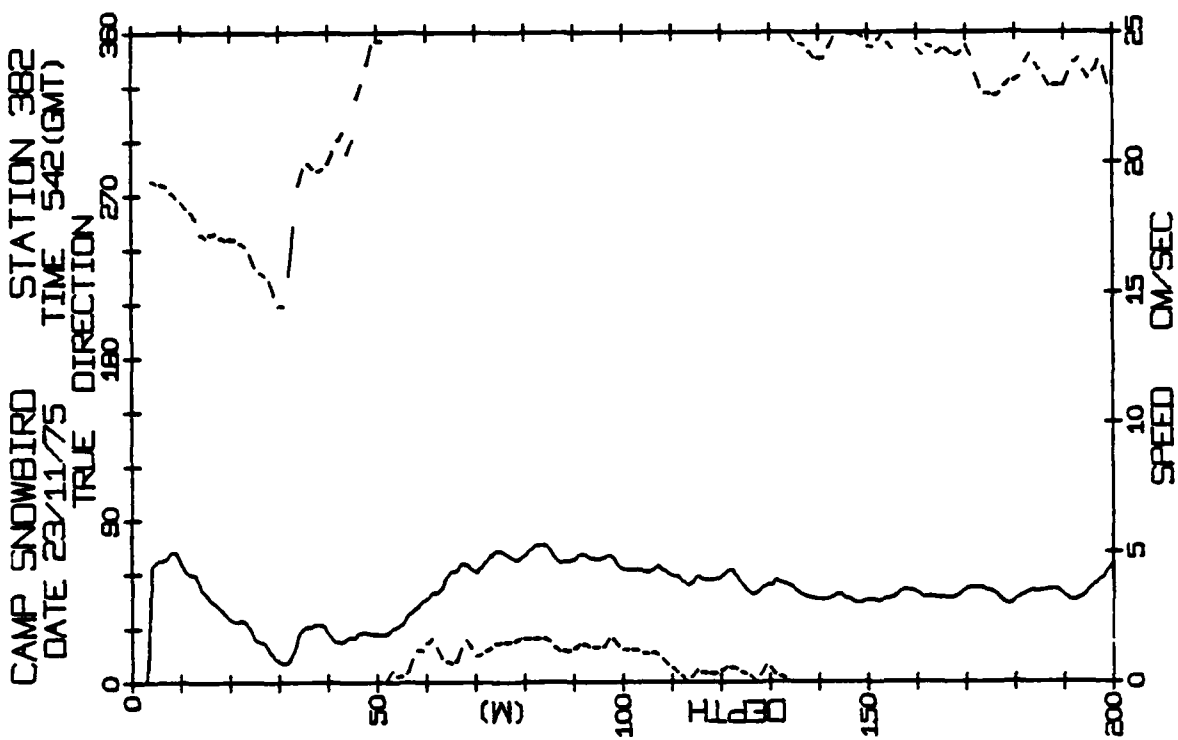


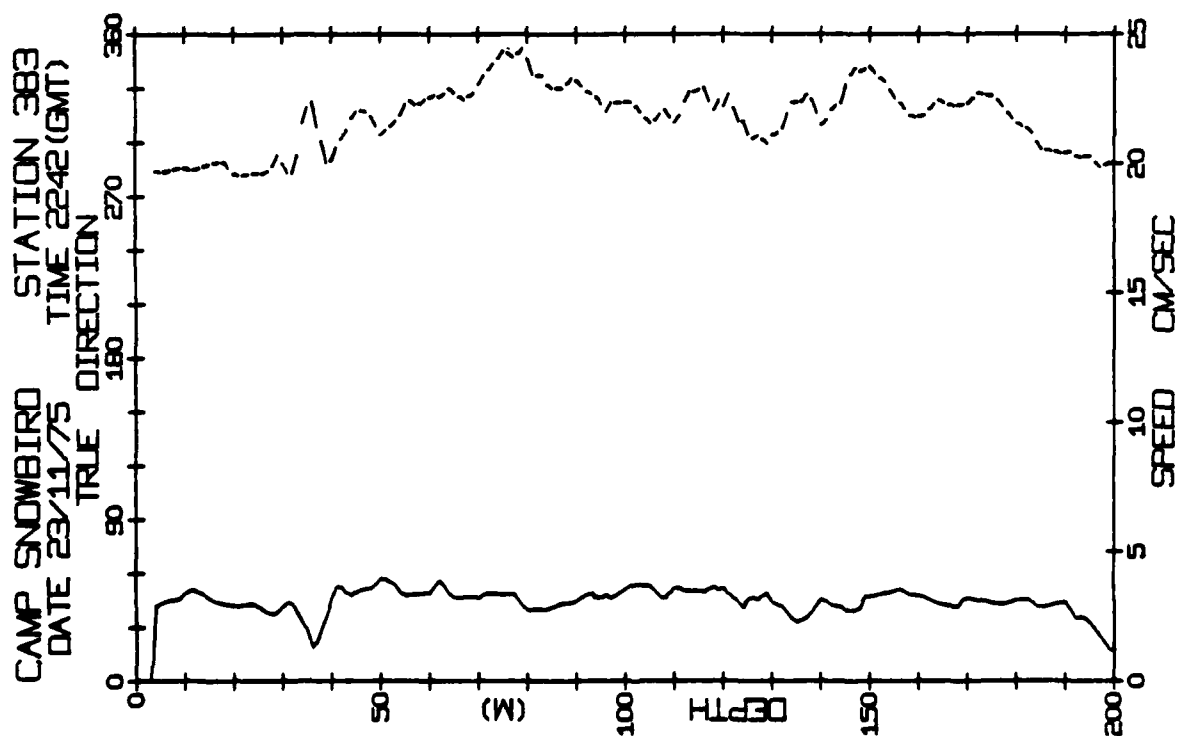
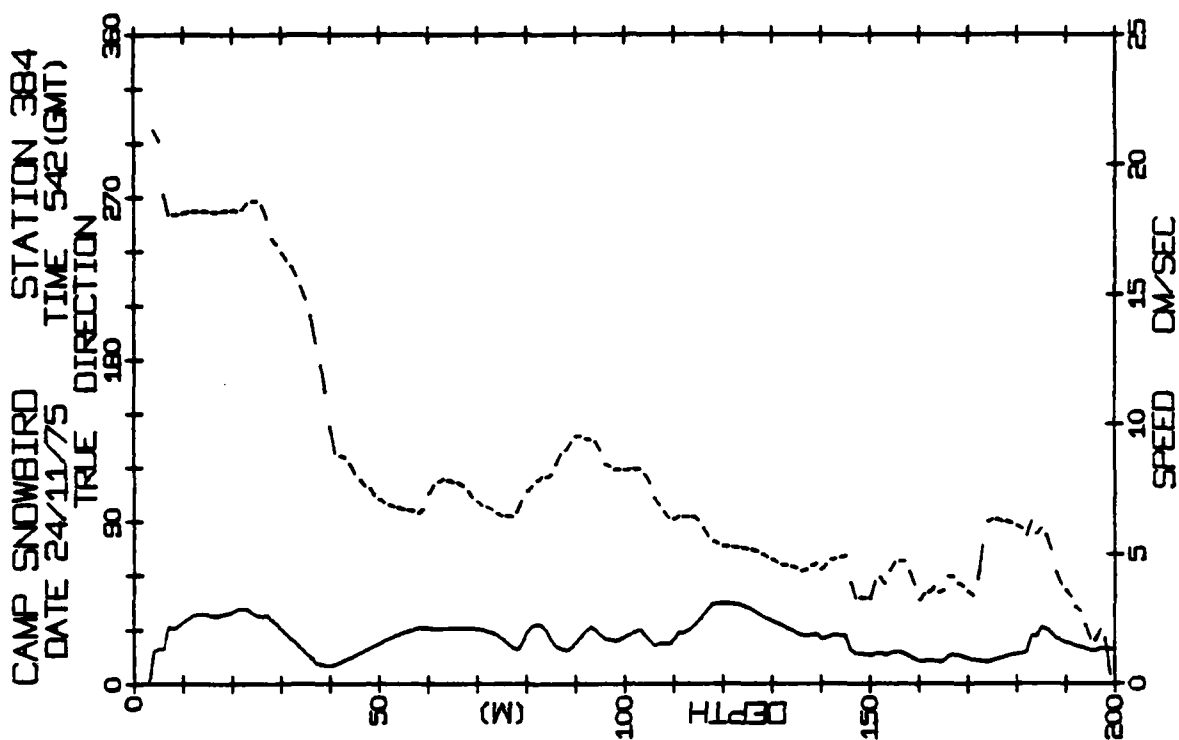
CAMP SNOWBIRD STATION 376
DATE 19/11/75 TIME 2242 (GMT)

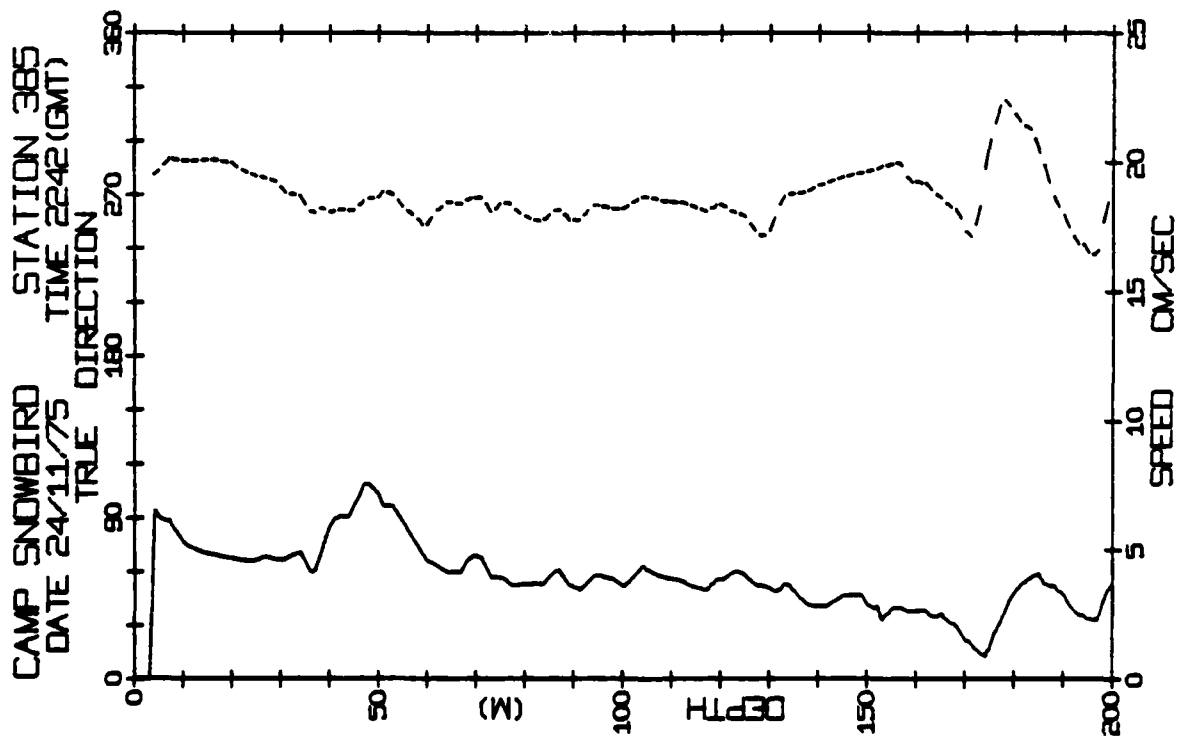
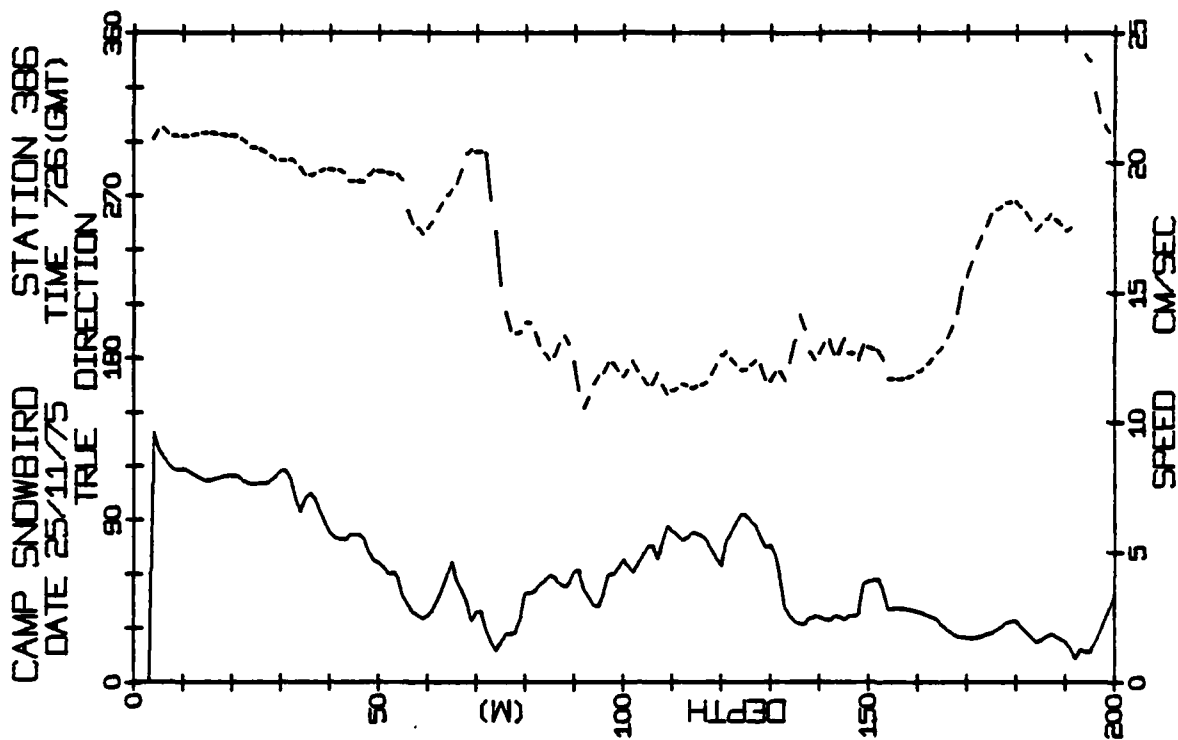


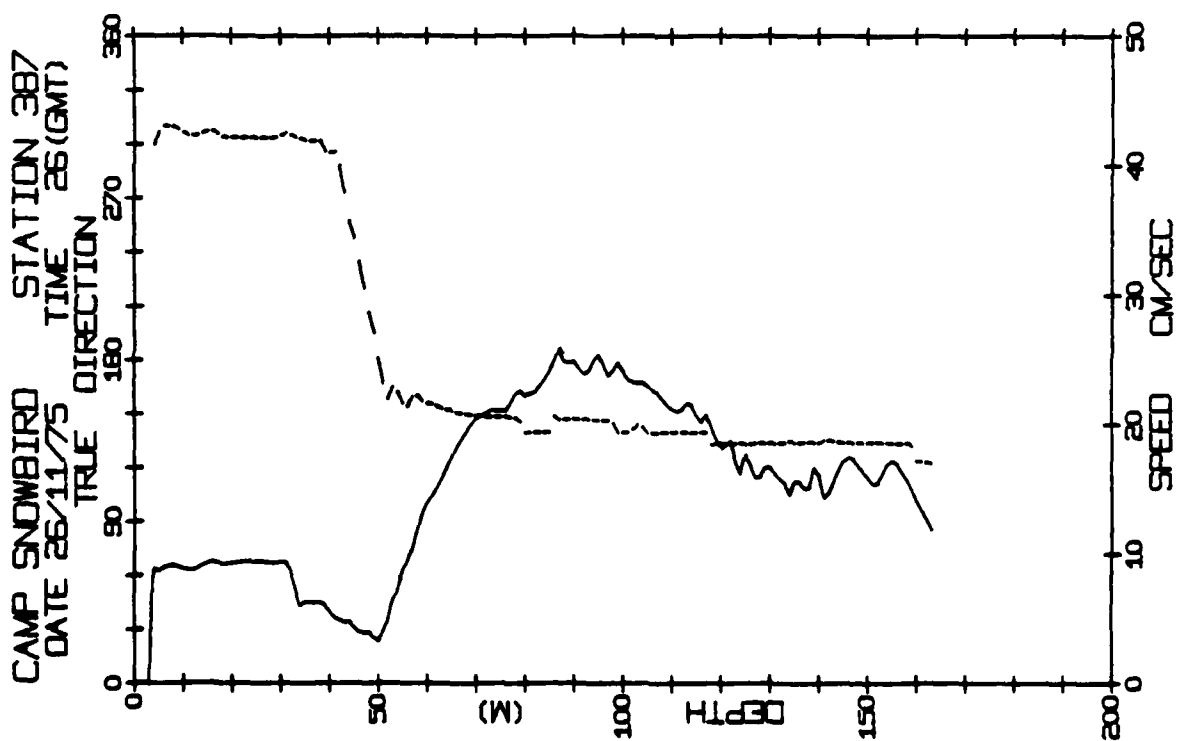
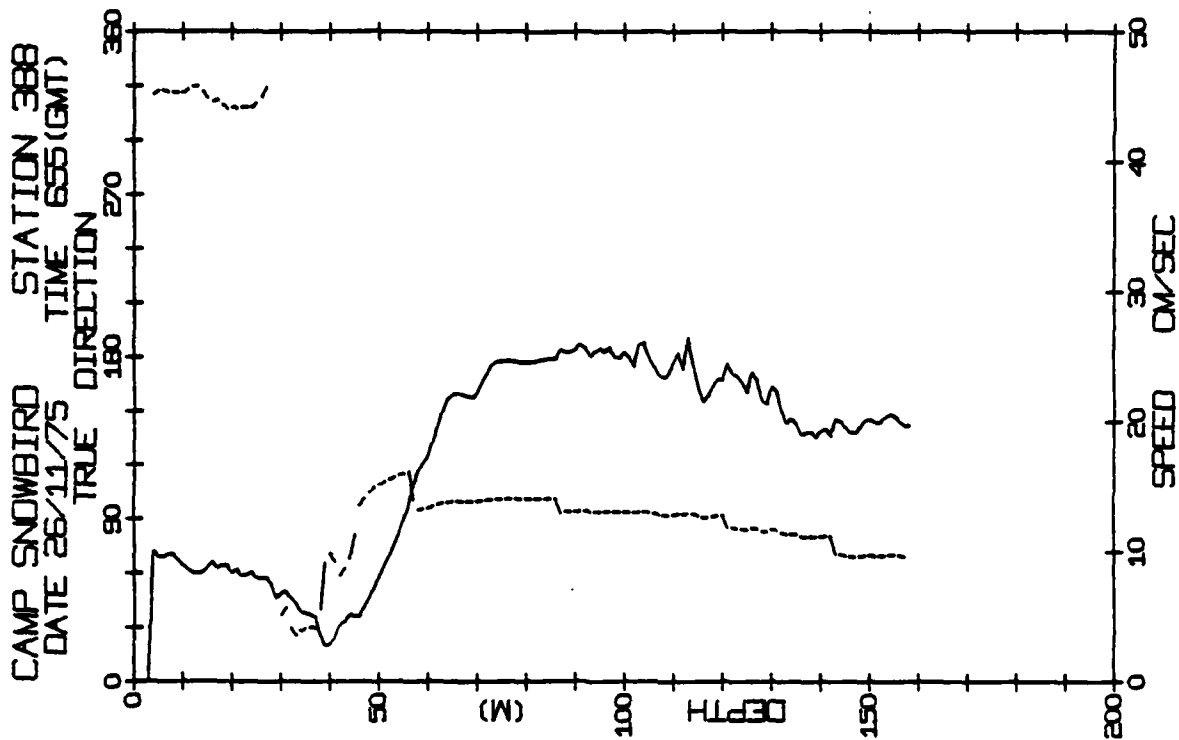




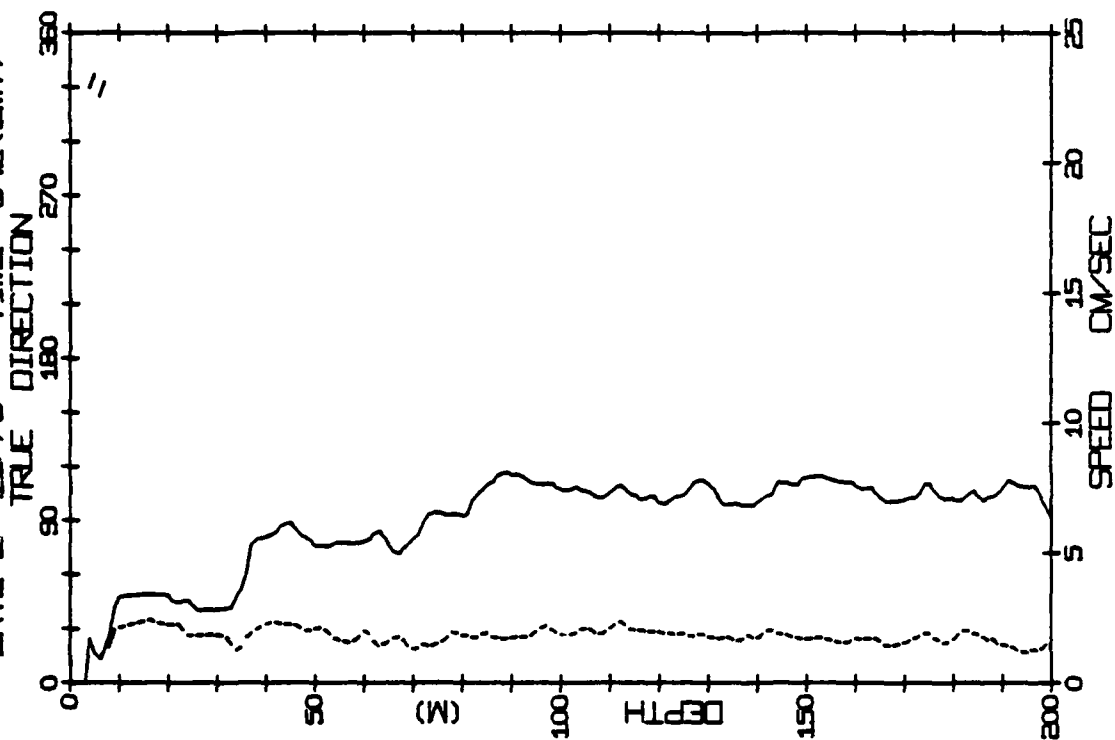




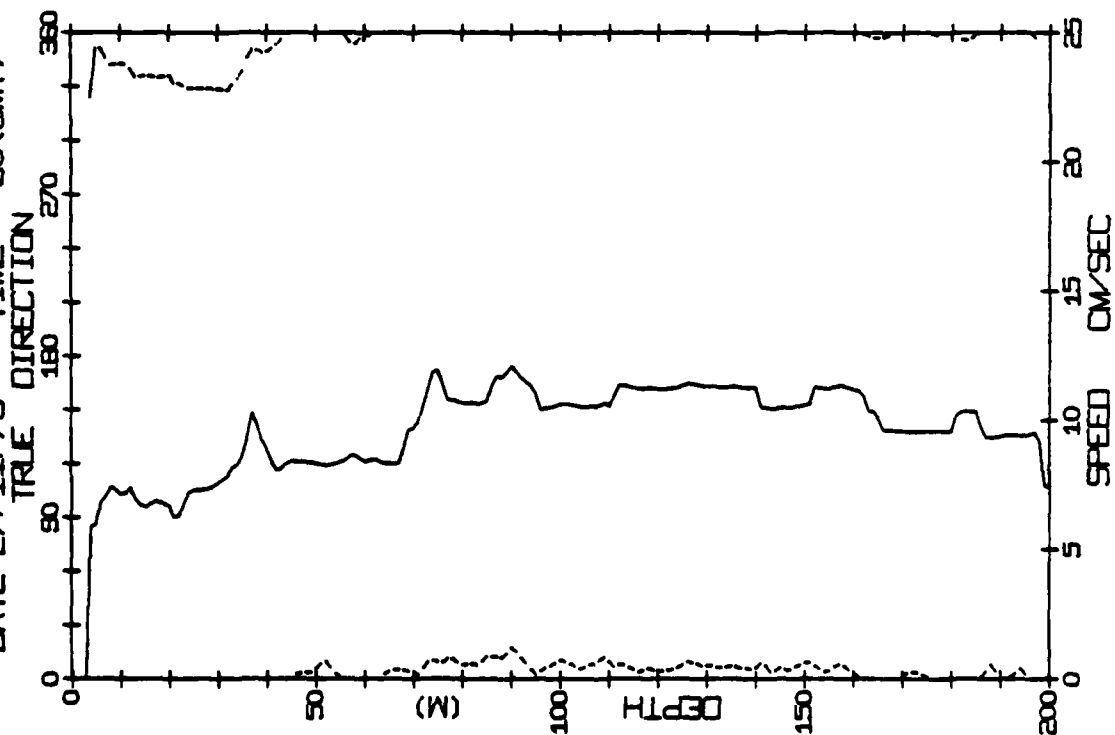




CAMP SNOWBIRD STATION 390
 DATE 2-11/75 TIME 542 (GMT)

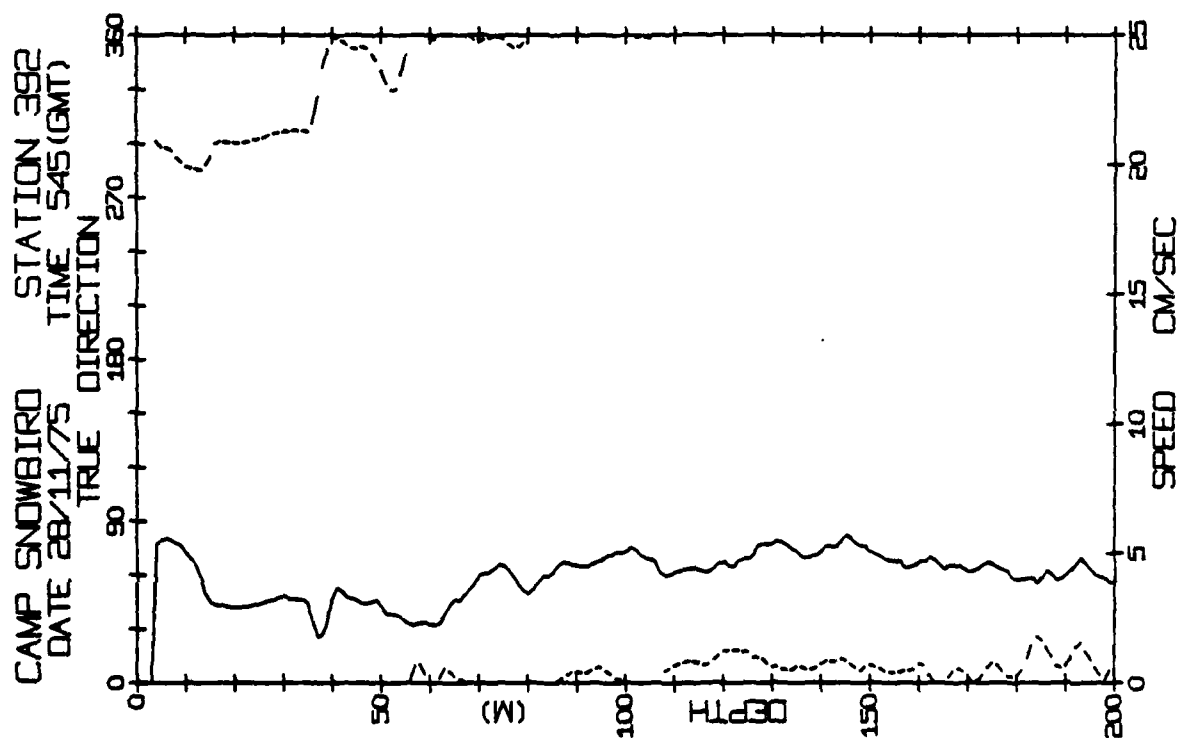
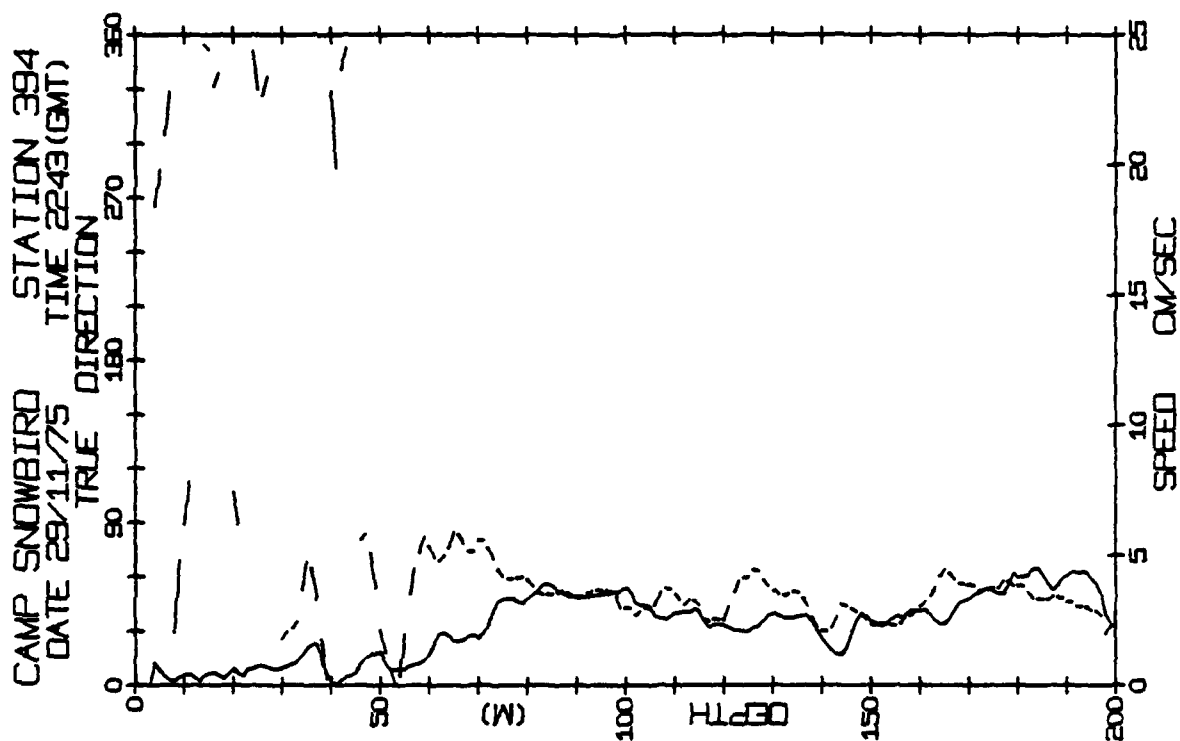


CAMP SNOWBIRD STATION 389
 DATE 27/11/75 TIME 30 (GMT)



SNOWBIRD STATION 389 (200M.) 27/NOV/75 30 GMT
 LAT= 73.9904N LONG= 144.7485W LTER= 0. LGER= 0.
 NIVEL= 10.4 EIVEL= -8.6 NVER= 0. EVER= 0.

[illegible][illegible]

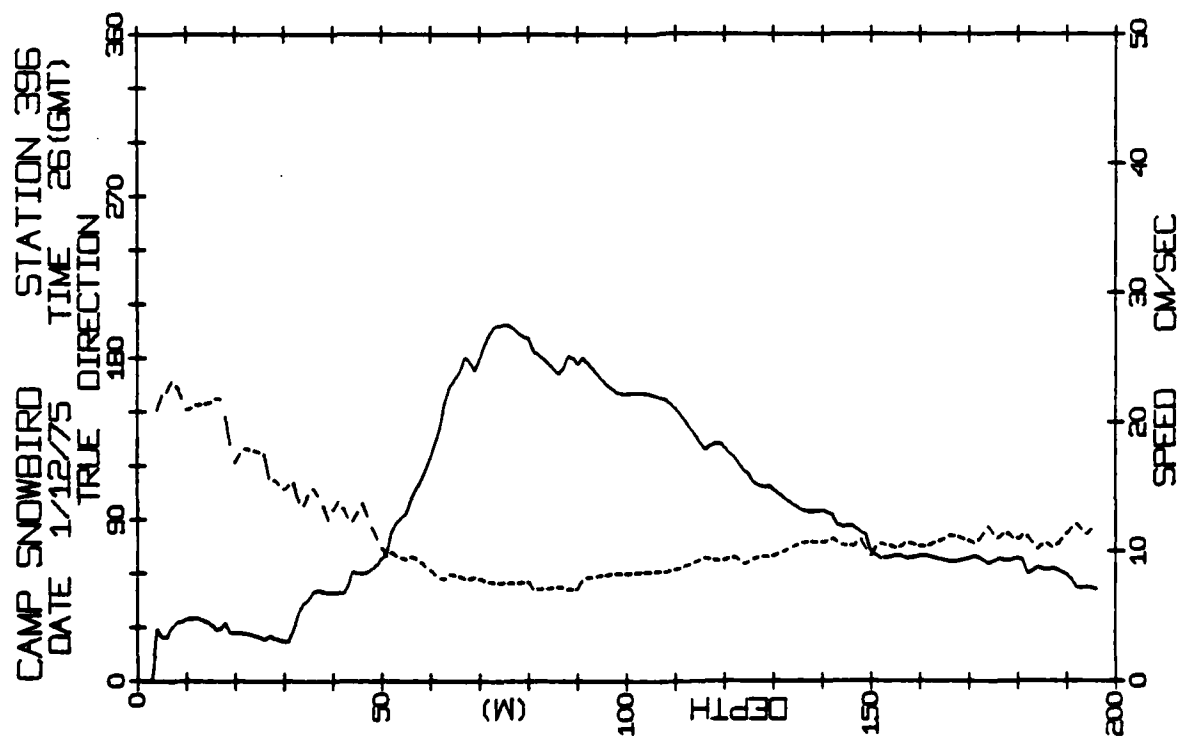
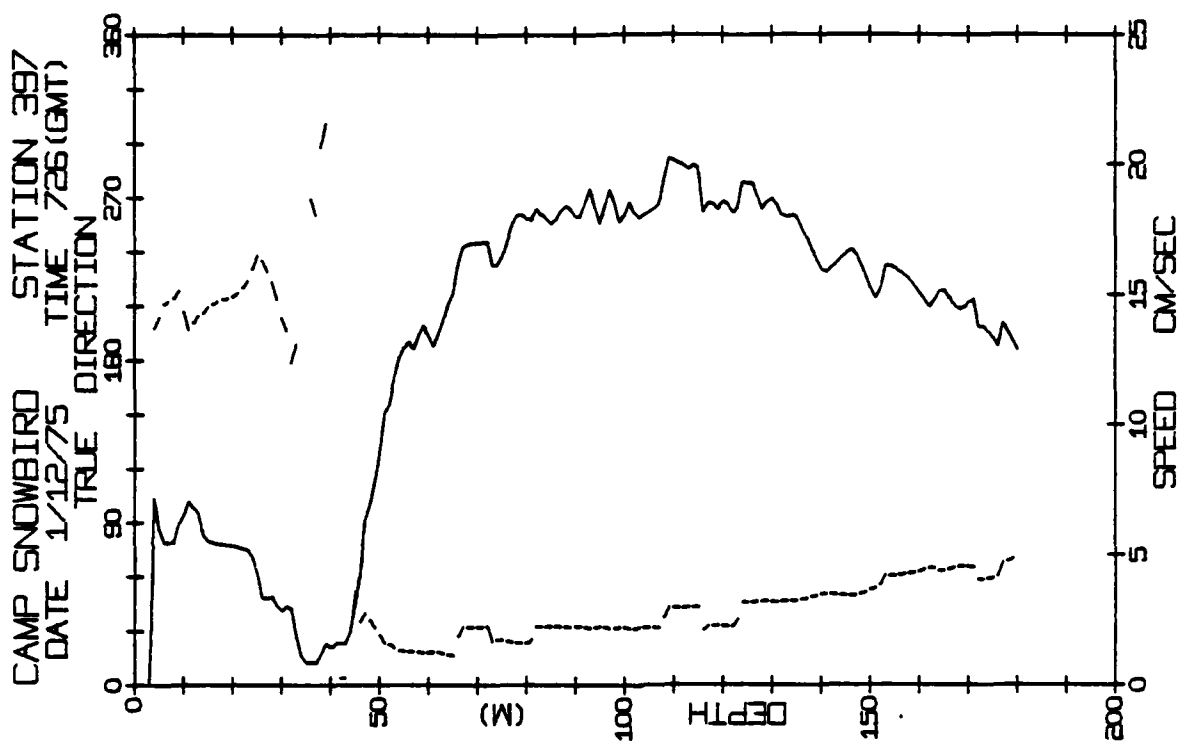


```

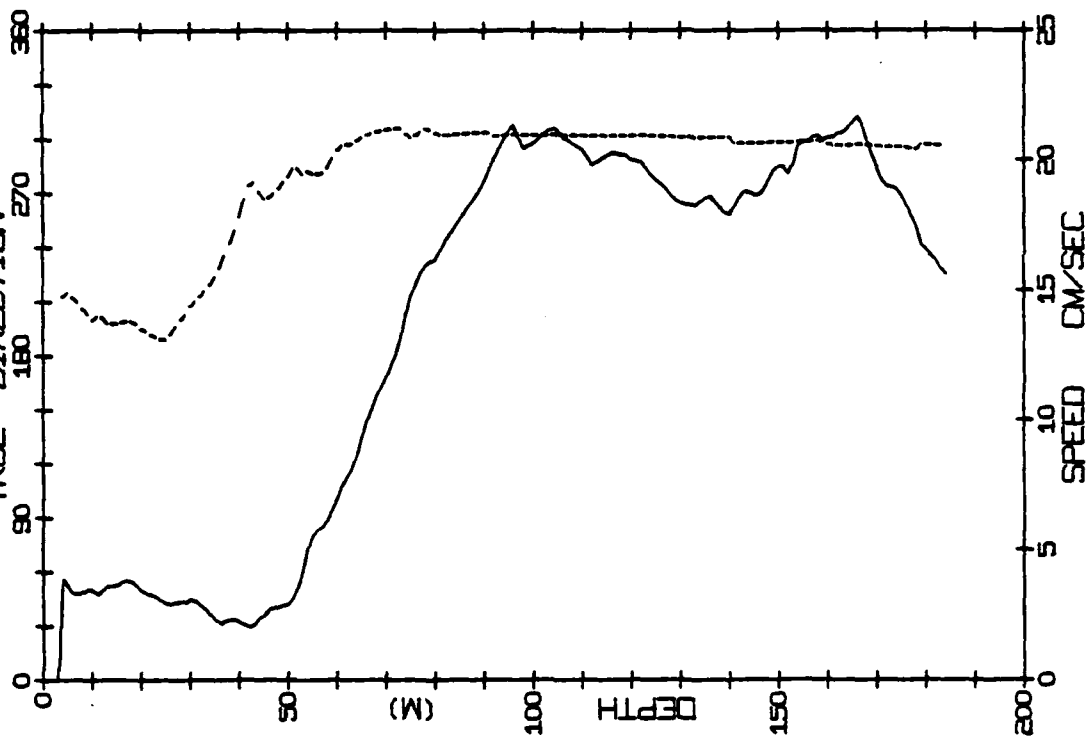
SNOWBIRD STATION 392      (200M.)      28/NOV/75      545 GHT
LAT= 74.0130N      LONG= 144.8184W      LTER= 0      LGER= 0
NIVEL= 15      EIVEL= -4.5      NVER= 0      EVER= 0

```

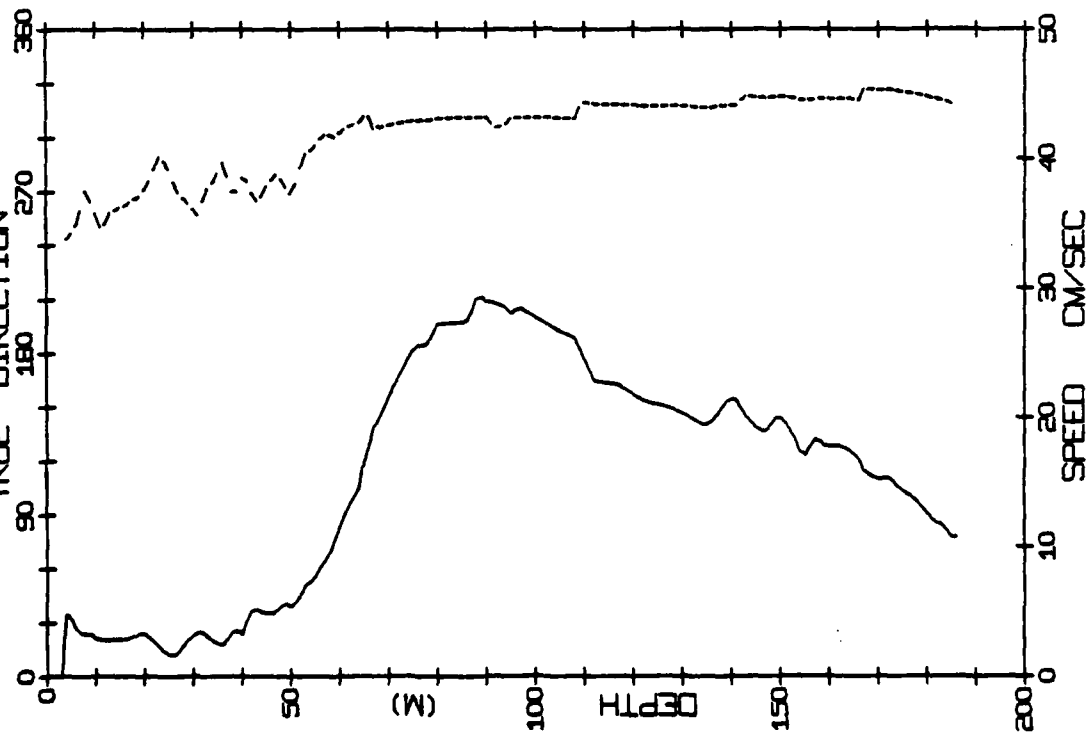
[illegible][illegible]



CAMP SNOWBIRD STATION 399
 DATE 2/12/75 TIME 543(GMT)
 TRUE DIRECTION



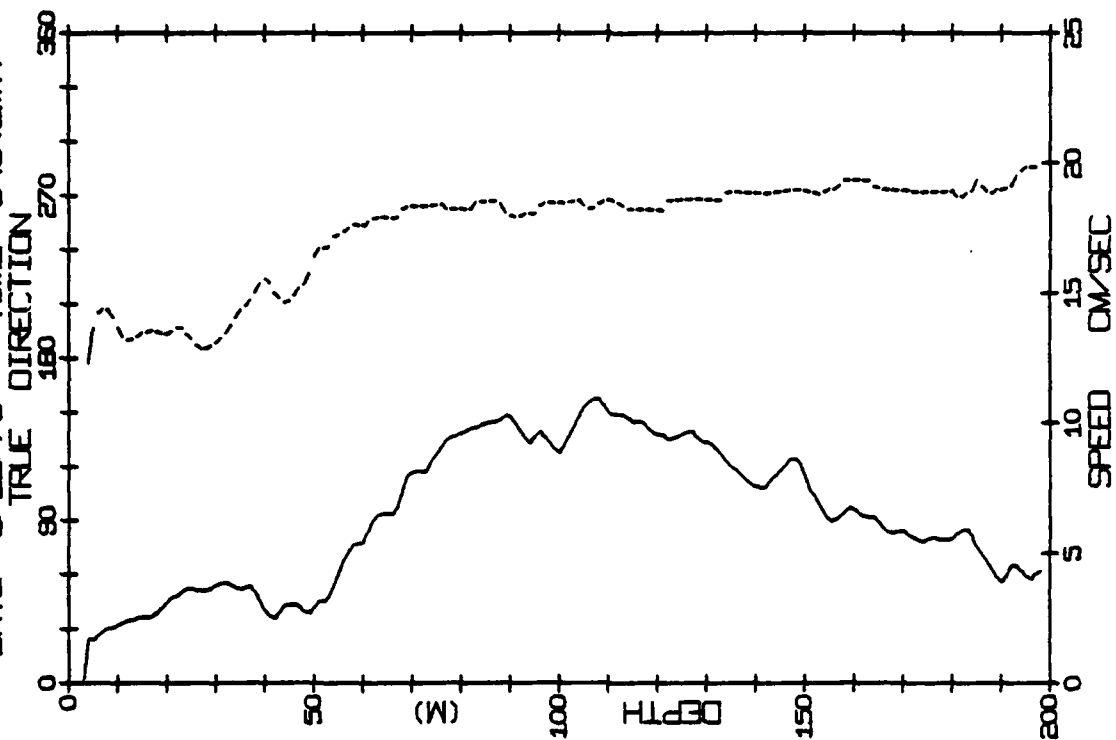
CAMP SNOWBIRD STATION 398
 DATE 2/12/75 TIME 26(GMT)
 TRUE DIRECTION



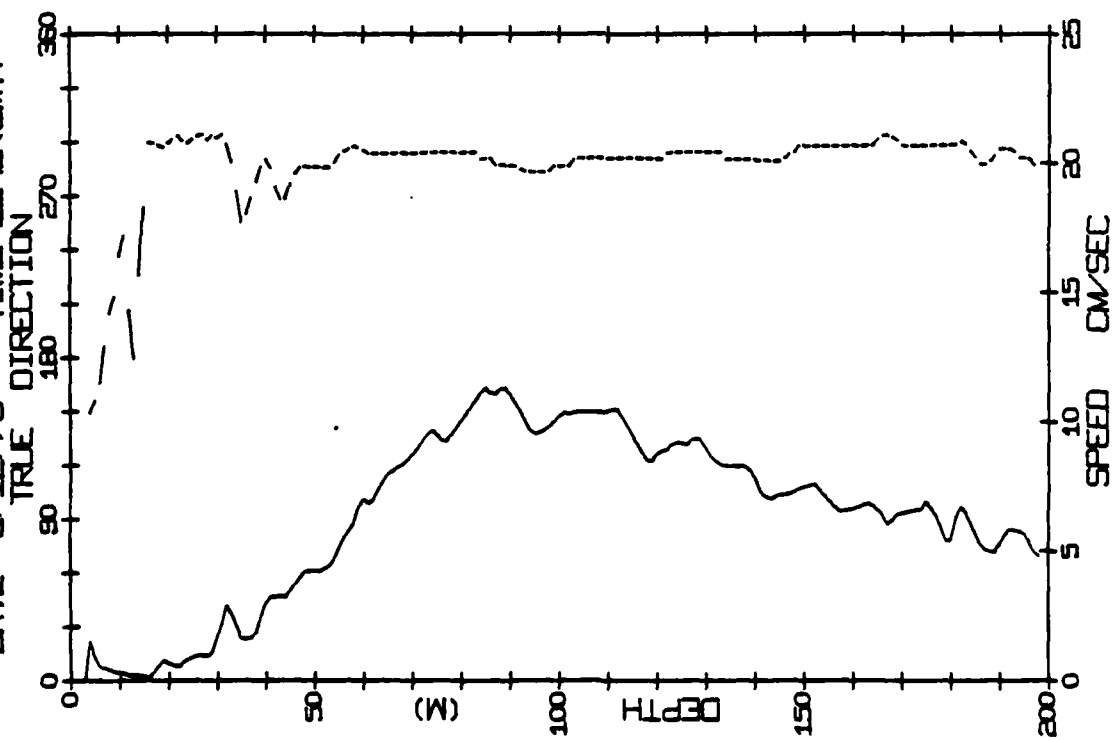
SNOWBIRD STATION 398 (186M) 2/DEC/75 26 GMT
LAT = 73.8973N LONG = 144.9683W LTER = 1 LGER = 2
NIVEL = -5.6 EIVEL = -3.1 NVER = 0 EVER = 0

[illegible][illegible]

CAMP SNOWBIRD STATION 401
 DATE 3/12/75 TIME 543(GMT)



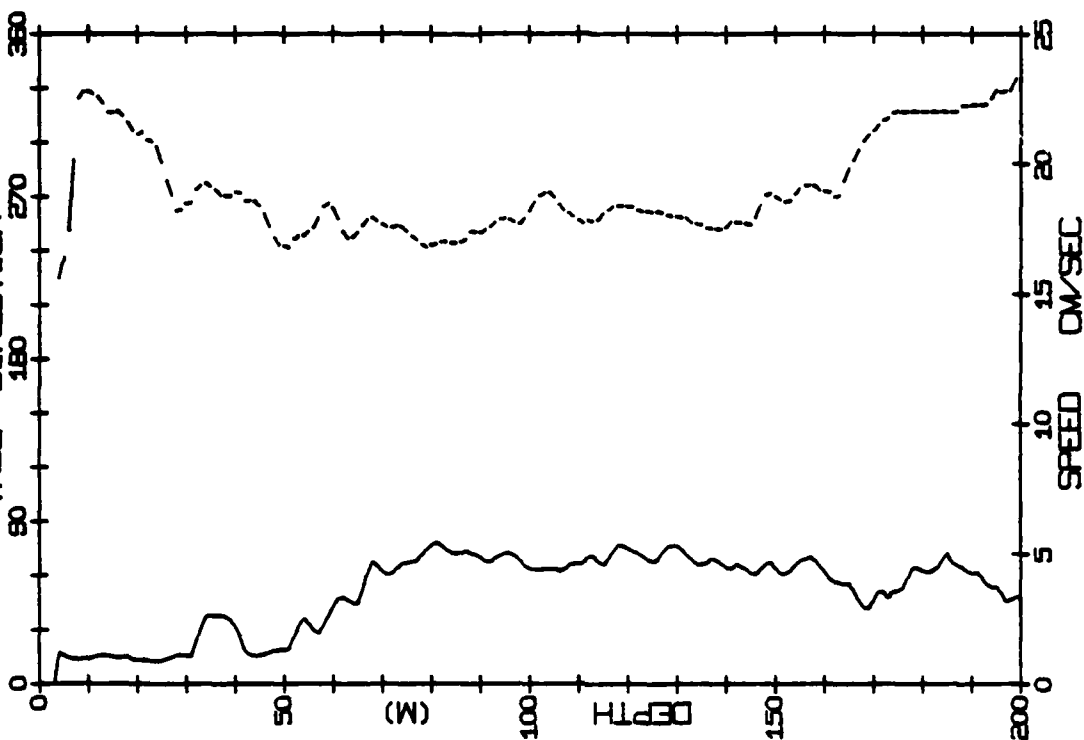
CAMP SNOWBIRD STATION 400
 DATE 2/12/75 TIME 2242(GMT)



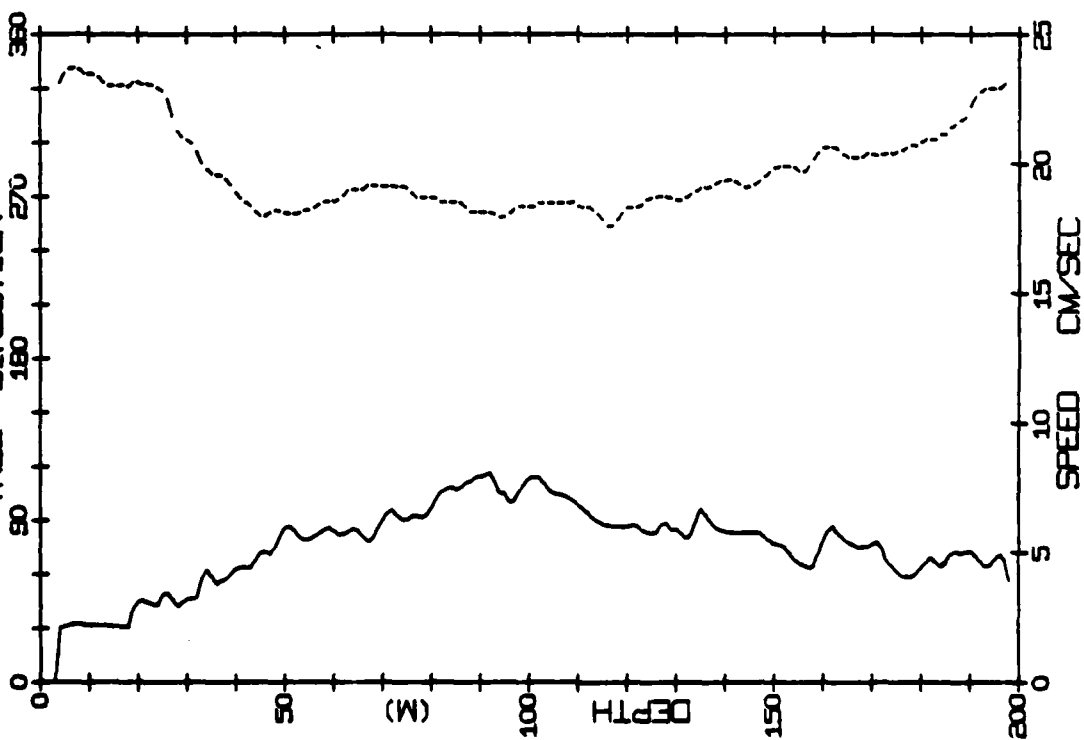
SNOWBIRD STATION 400 (198M) 2/DEC/75 2242 GMT
LAT= 73.8672N LONG= 144.9344W LTER= 0 LGER= 0
NIVEL= -2 0 EIVEL= 3 4 NVER= 0 EVER= 0

[illegible][illegible]

CAMP SNOWBIRD STATION 403
 DATE 4/12/75 TIME 543(GMT)
 TRUE DIRECTION

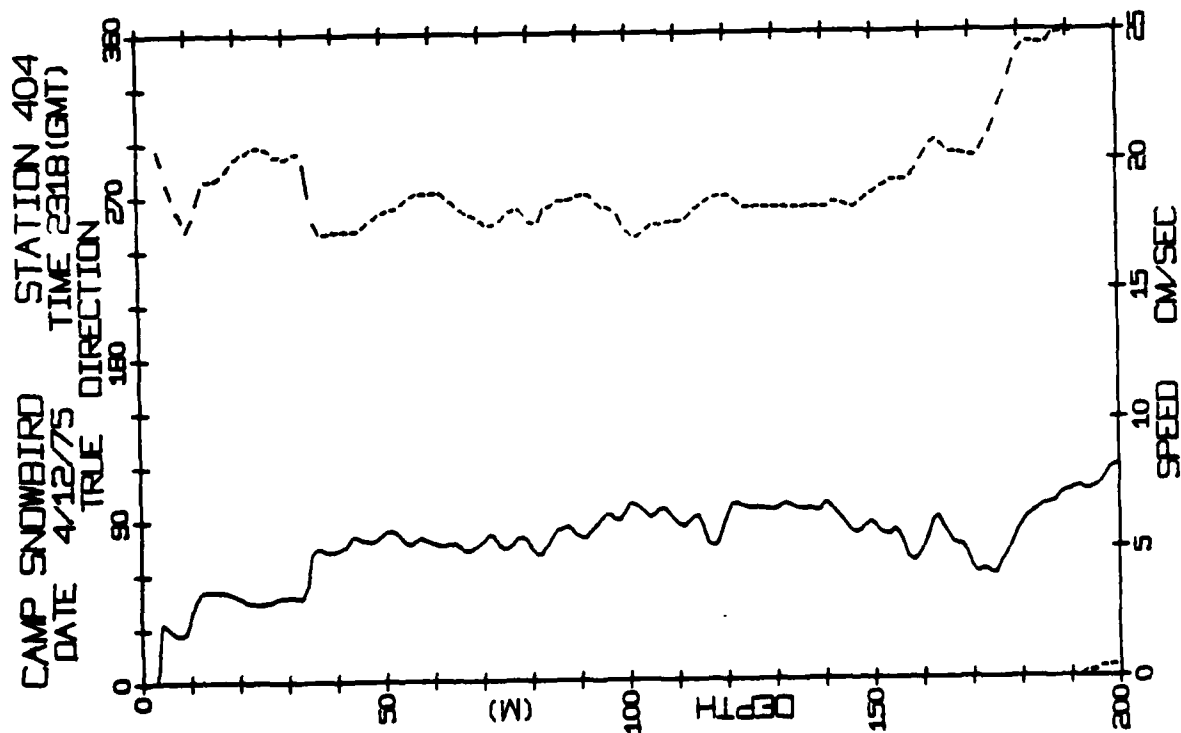
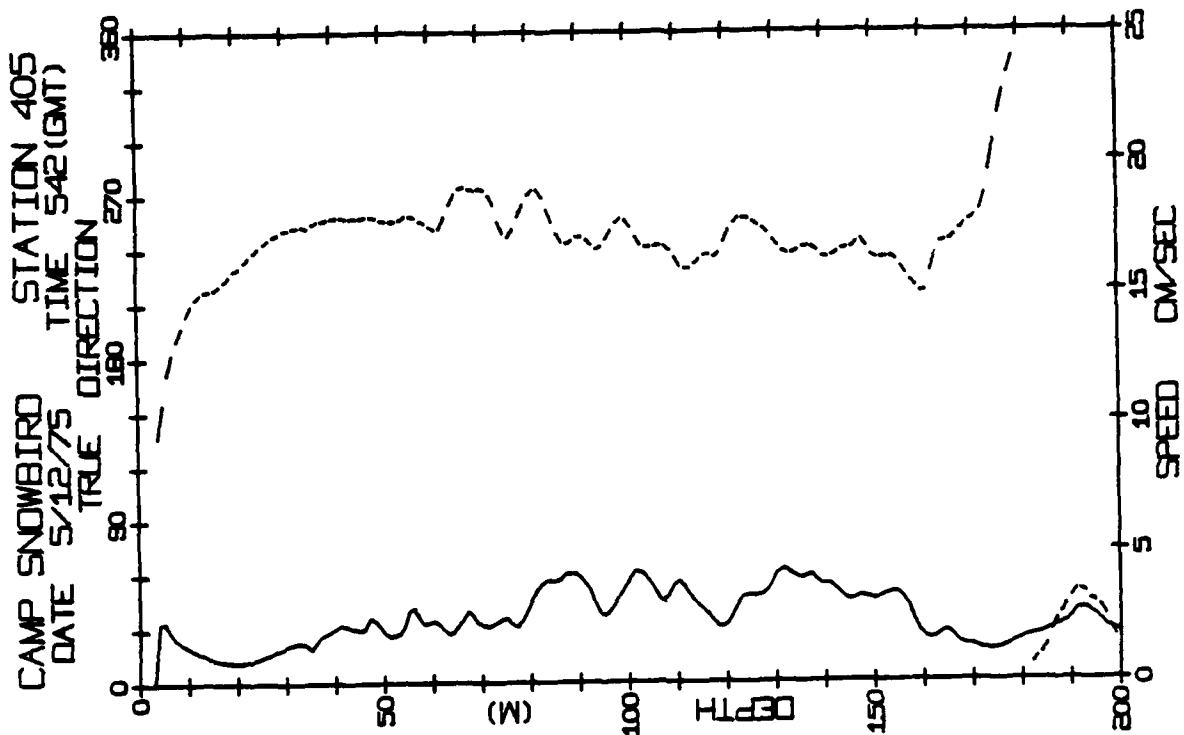


CAMP SNOWBIRD STATION 402
 DATE 3/12/75 TIME 2329(GMT)
 TRUE DIRECTION

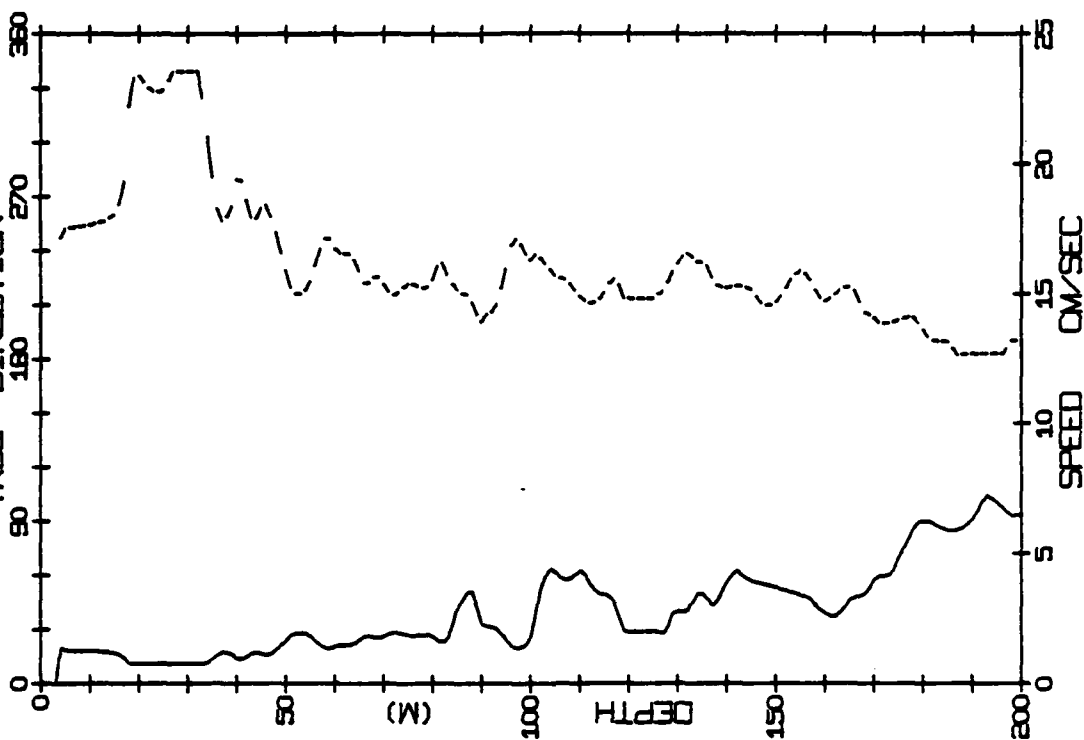


SNOWBIRD STATION 402 (198M.) 3/DEC/75 2328 GMT
LAT= 73 8572N LONG= 144.8423W LTER= 1. LGER= 2.
NIVEL= 0 3 EIVEL= 0 0 NVER= 0. EVER= 0.

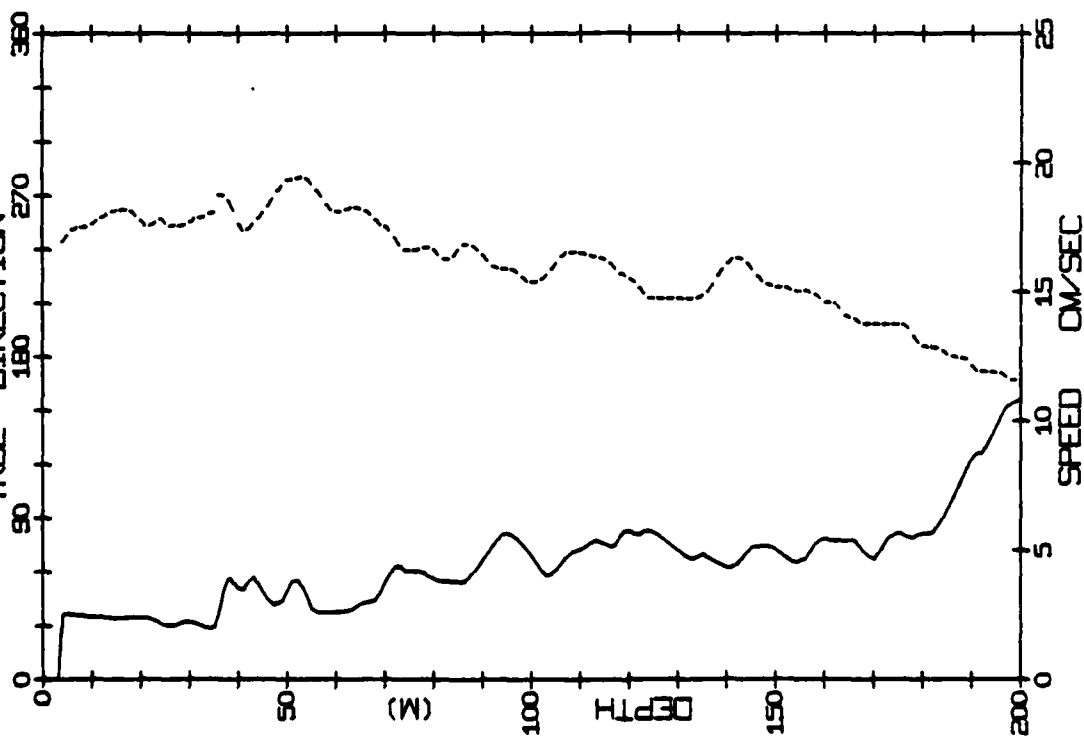
[illegible][illegible]



CAMP SNOWBIRD STATION 407
 DATE 6/12/75 TIME 605(GMT)
 TRUE DIRECTION



CAMP SNOWBIRD STATION 406
 DATE 5/12/75 TIME 2243(GMT)
 TRUE DIRECTION

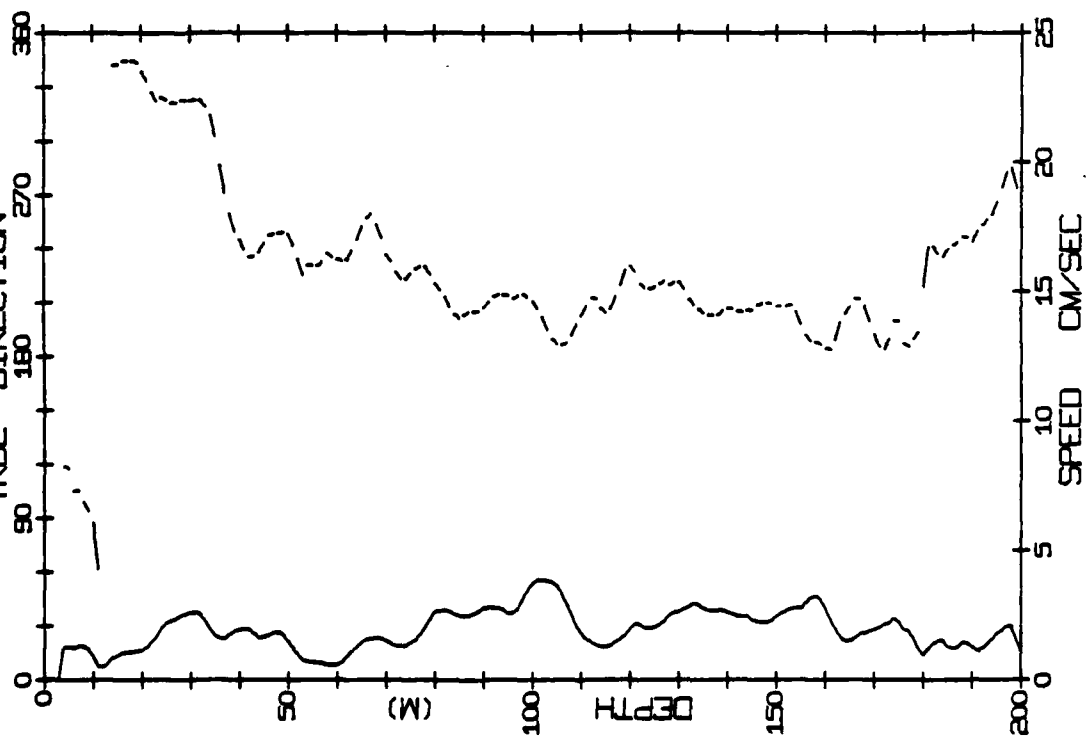


SNOWBIRD STATION 406 (200M.) 5/DEC/75 2243 GMT
LAT= 73.8523N LONG= 144.8274W LTER= 1. LGER= 1.
NIVEL= -0 5 EIVEL= -0.4 NVER= 0 EVER= 0.

[illegible]

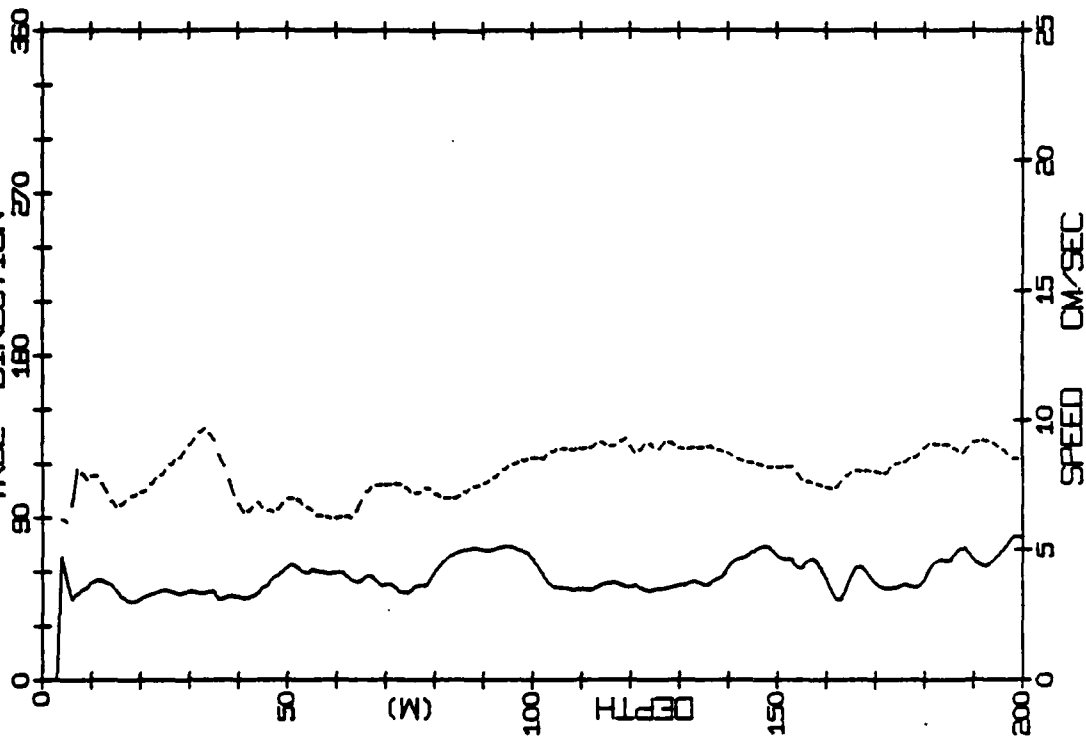
CAMP SNOWBIRD STATION 408
DATE 6/12/75 TIME 2242(GMT)

TRUE DIRECTION



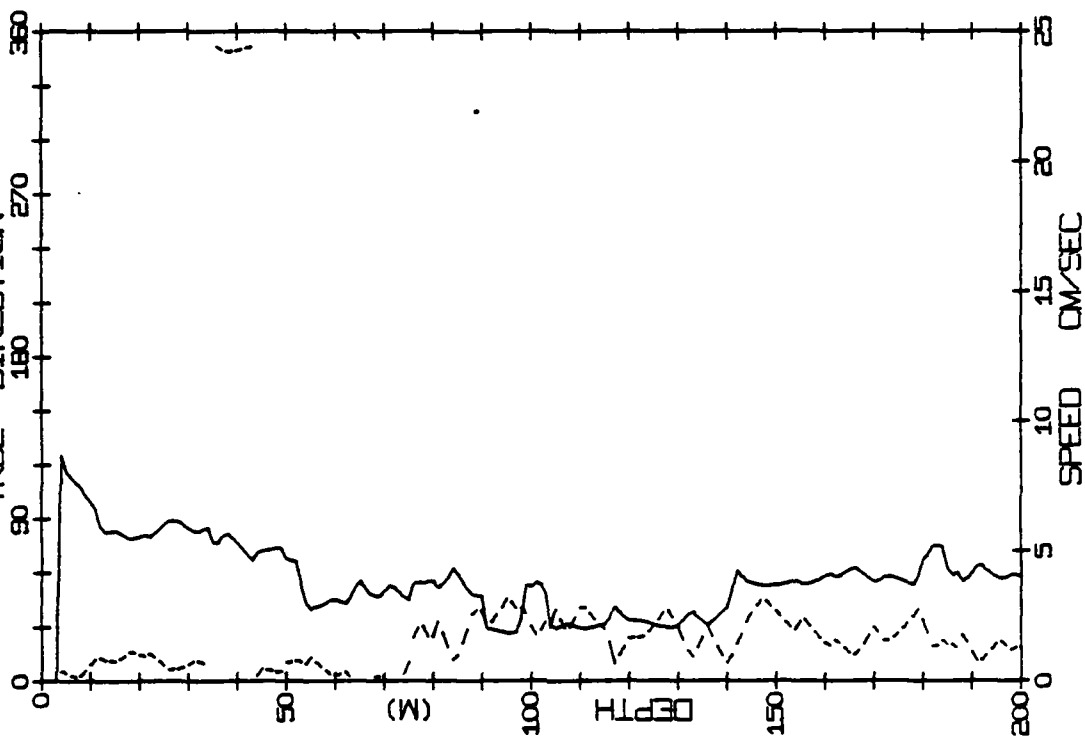
CAMP SNOWBIRD STATION 409
DATE 7/12/75 TIME 543(GMT)

TRUE DIRECTION



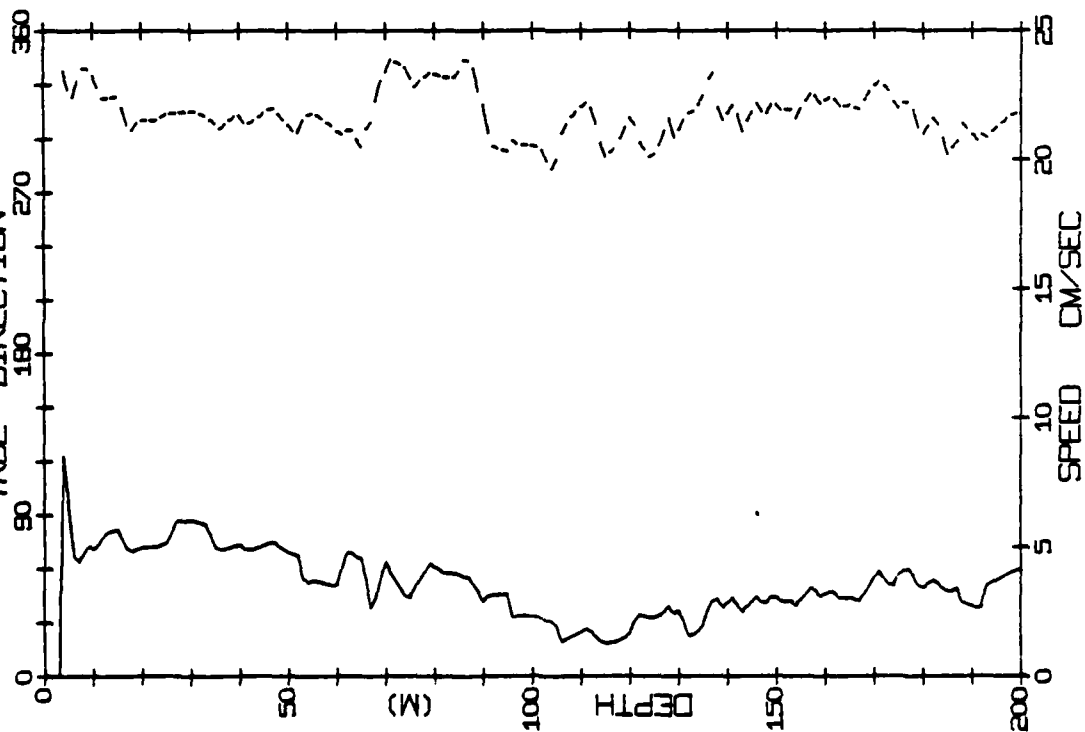
CAMP SNOWBIRD STATION 411
DATE 8/12/75 TIME 725 (GMT)

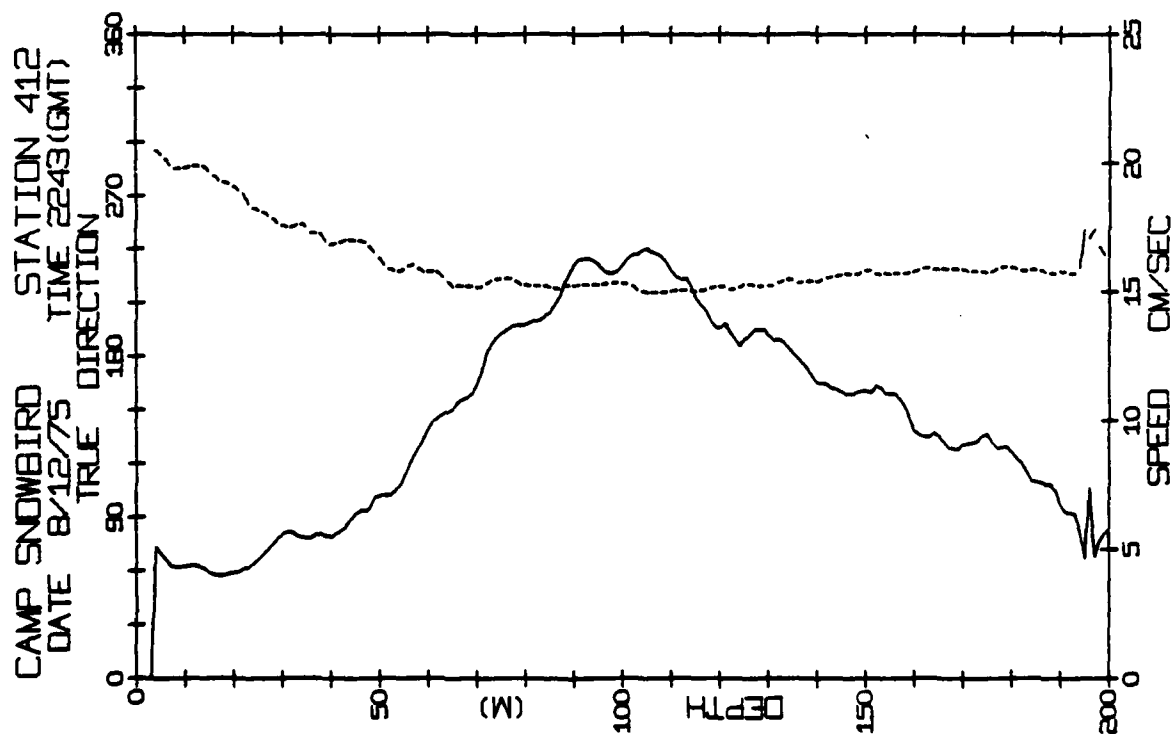
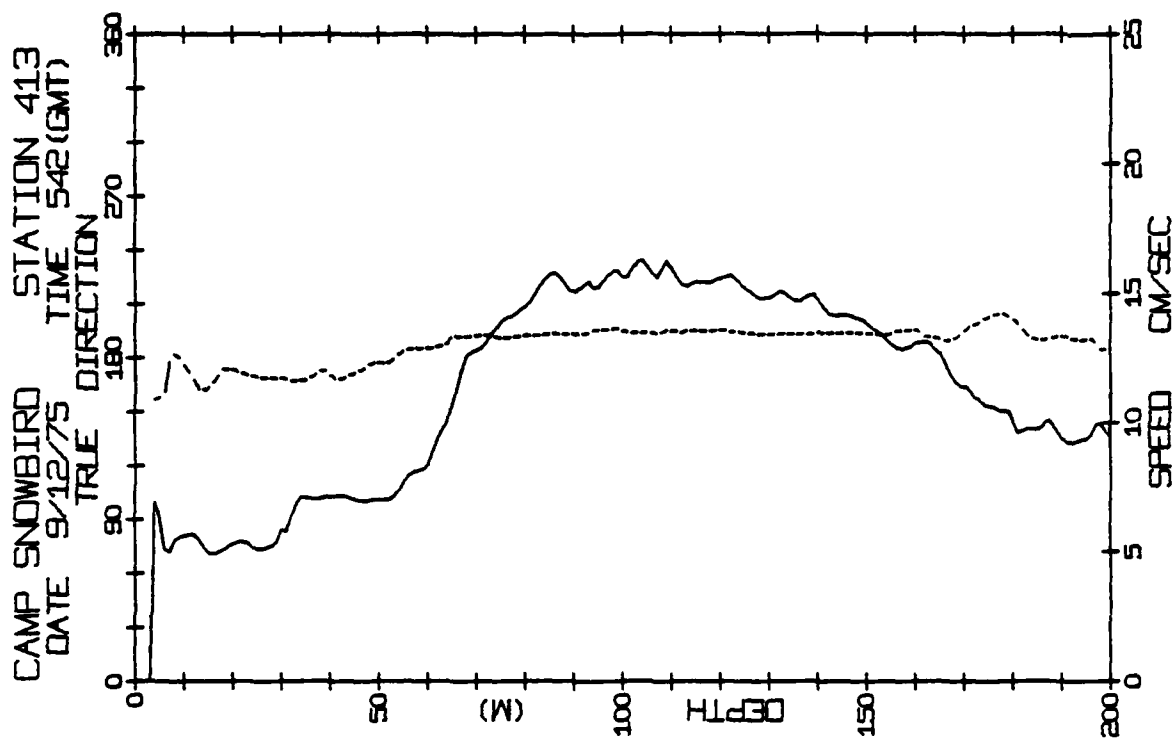
TRUE DIRECTION

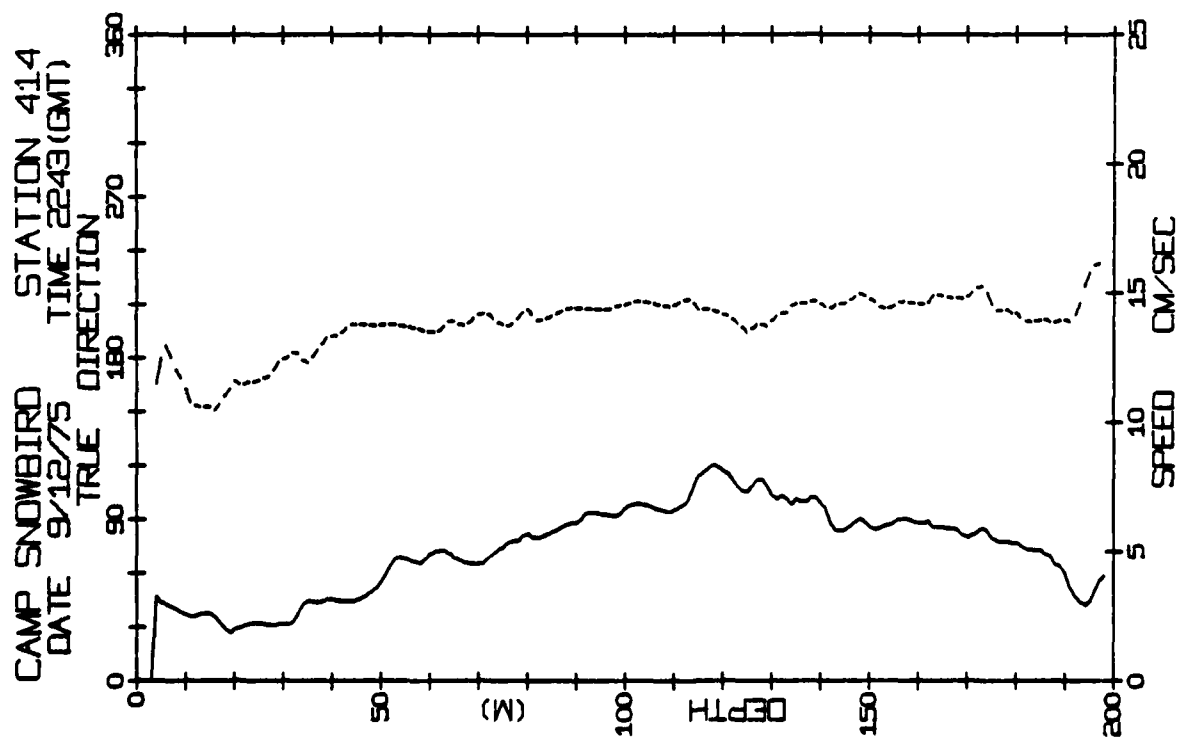
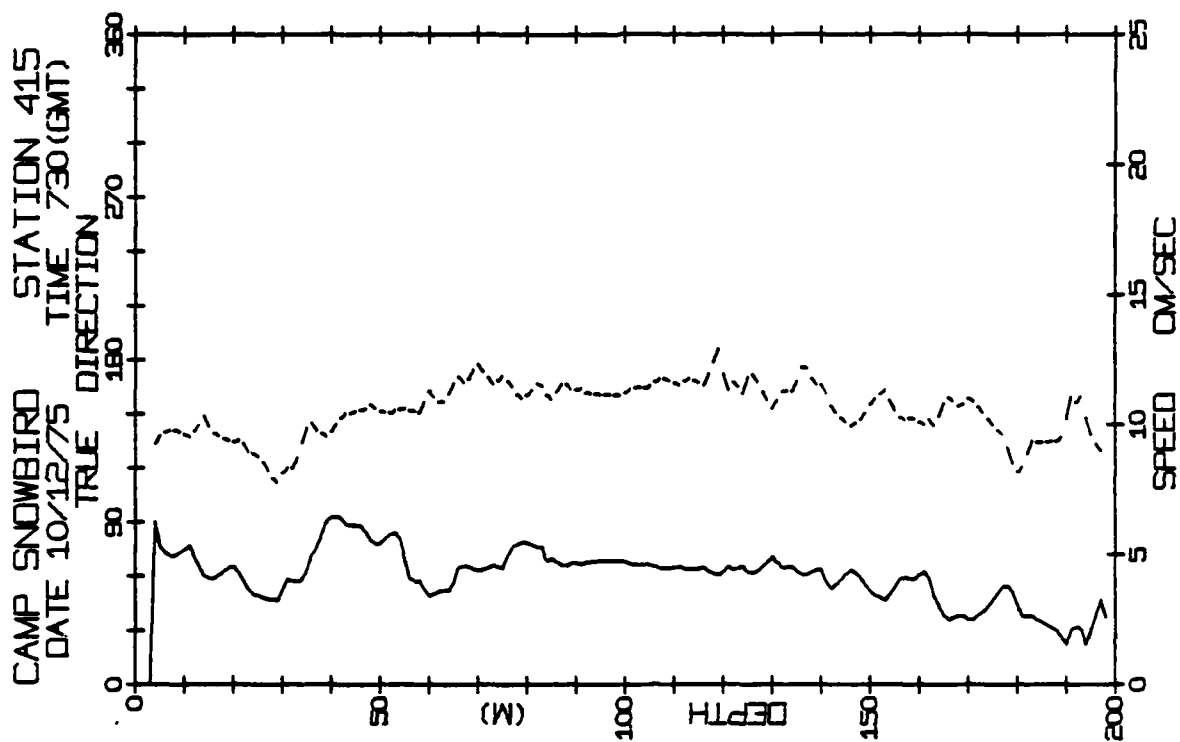


CAMP SNOWBIRD STATION 410
DATE 8/12/75 TIME 26 (GMT)

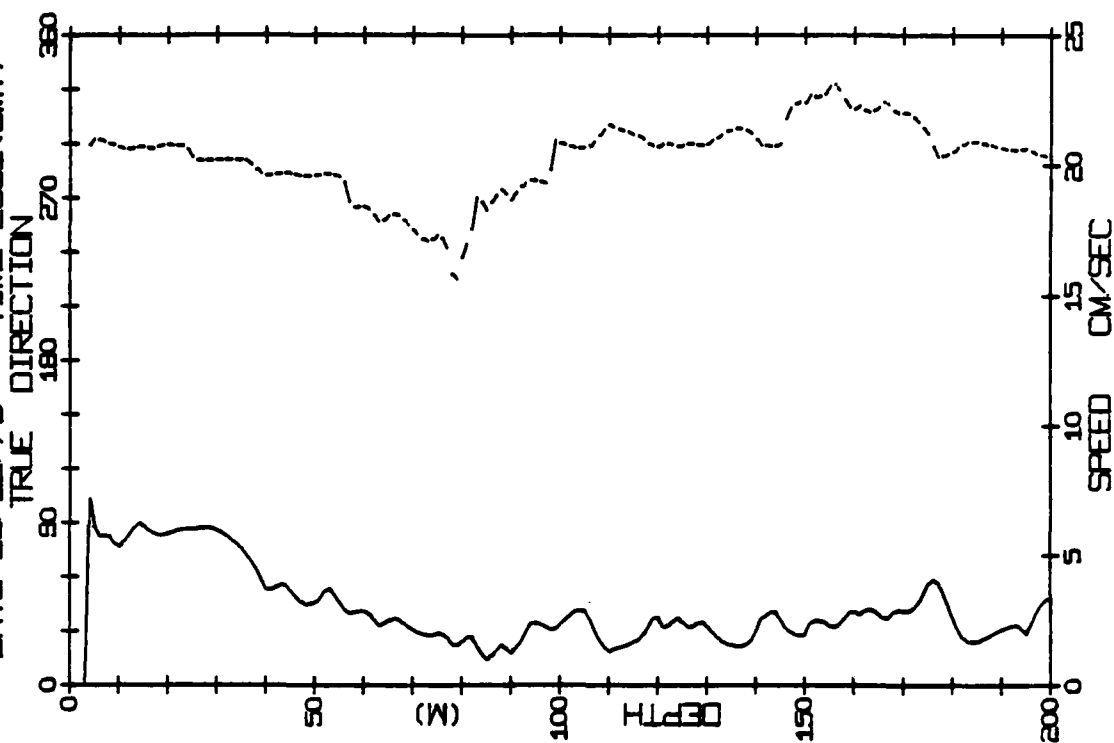
TRUE DIRECTION



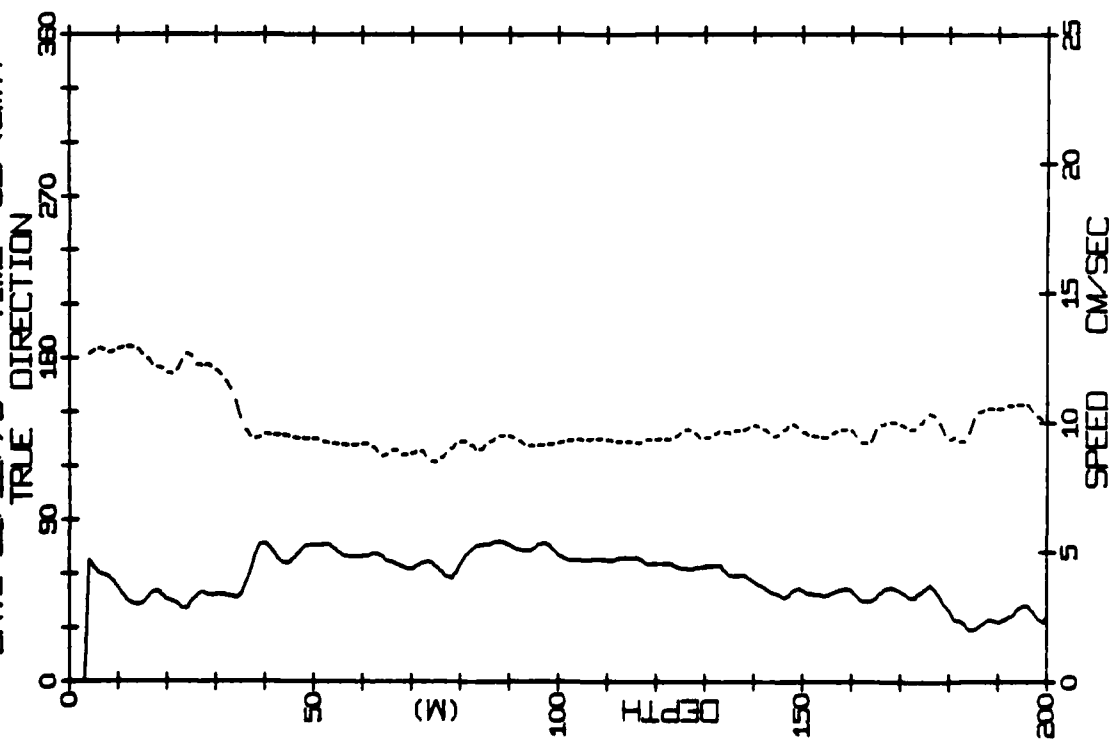




CAMP SNOWBIRD STATION 421
 DATE 13/12/75 TIME 2331 (GMT)



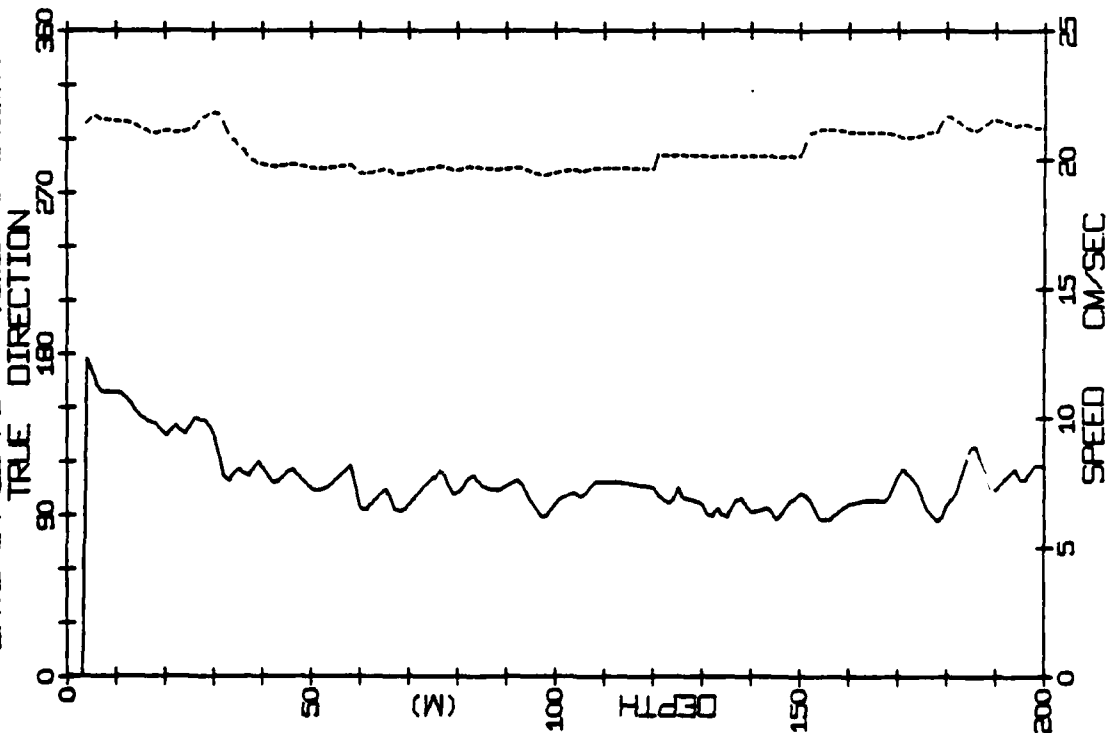
CAMP SNOWBIRD STATION 416
 DATE 11/12/75 TIME 617 (GMT)



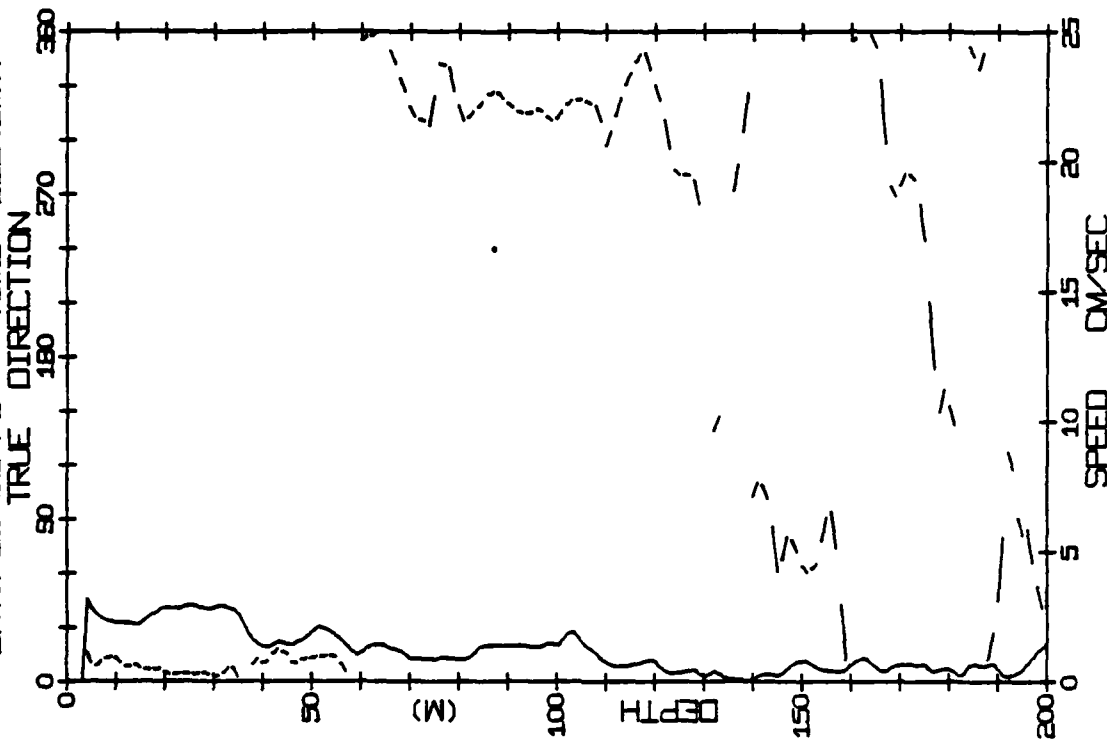
SNOWBIRD STATION 416 (200M.) 11/DEC/75 617 GMT
LAT= 73.8438N LONG= 144.5879W LTER= 1. LGER= 2.
NIVEL= -6.6 EIVEL= 2.4 NVER= 0. EVER= 0

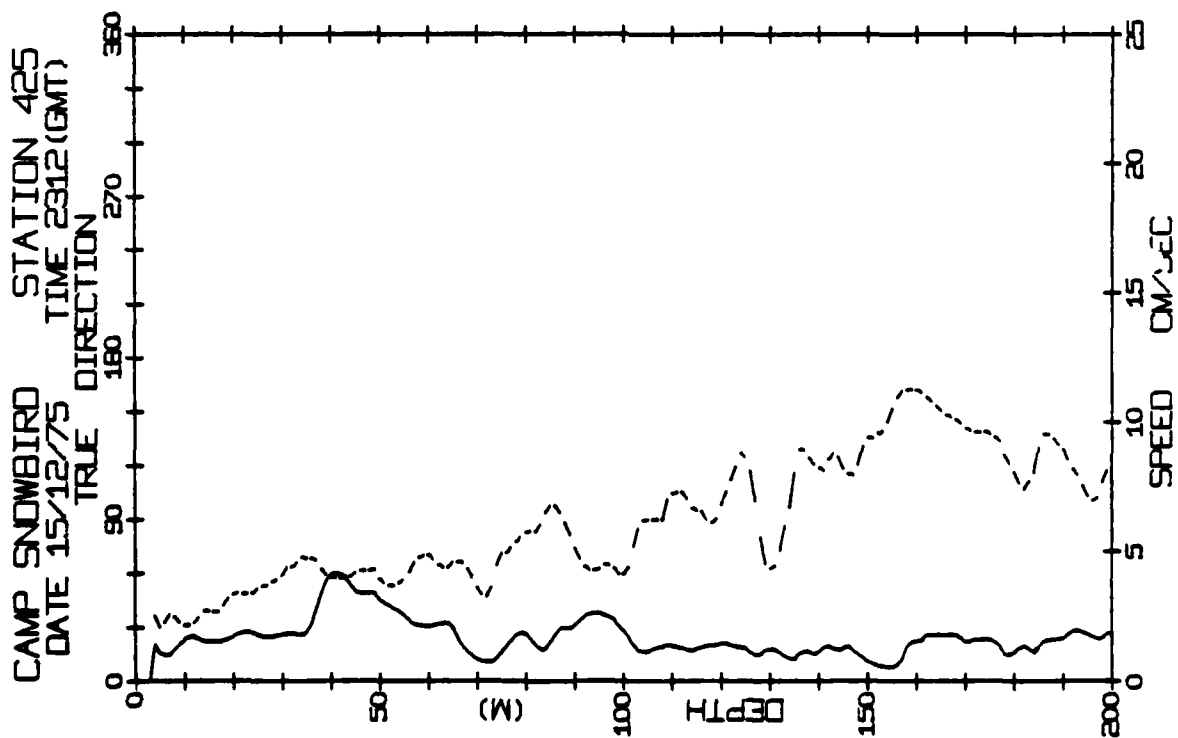
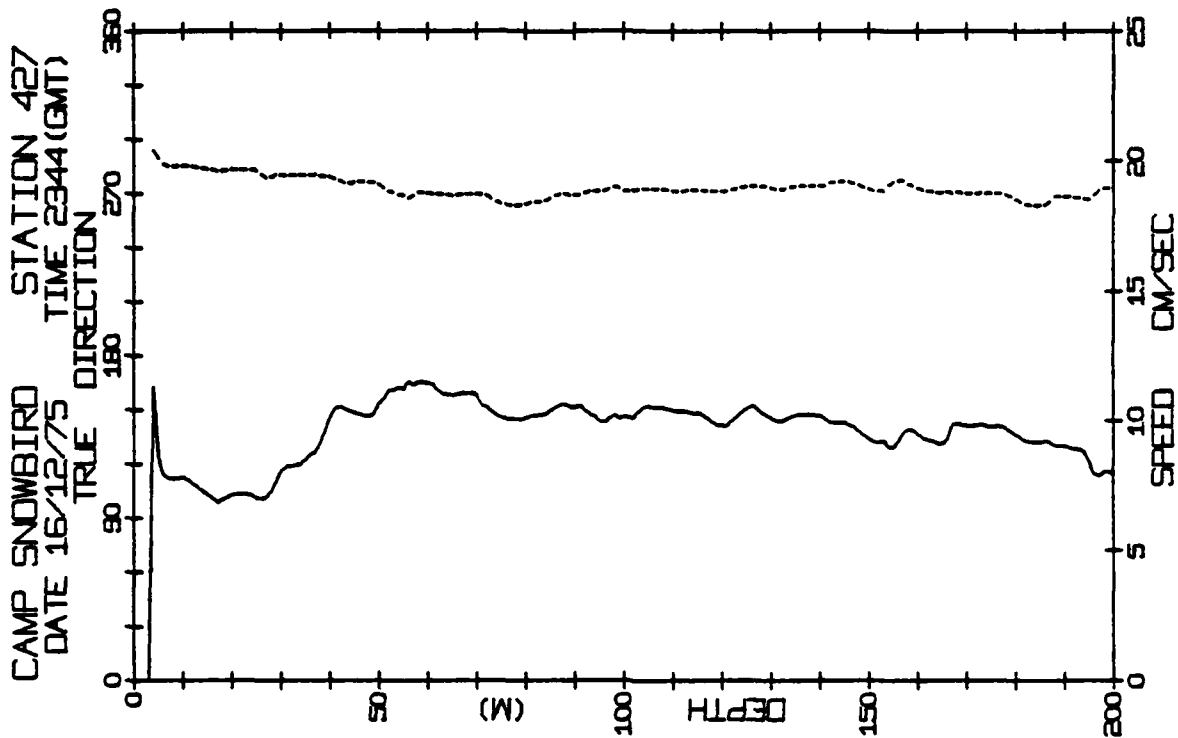
[illegible][illegible]

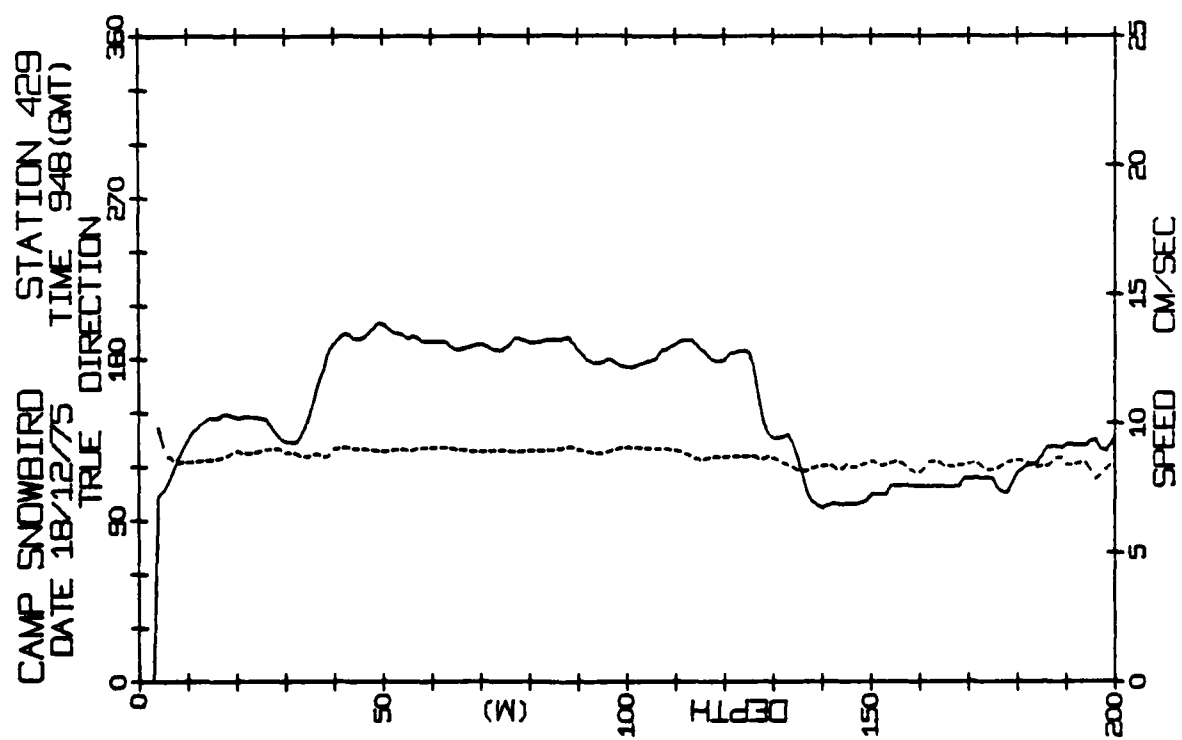
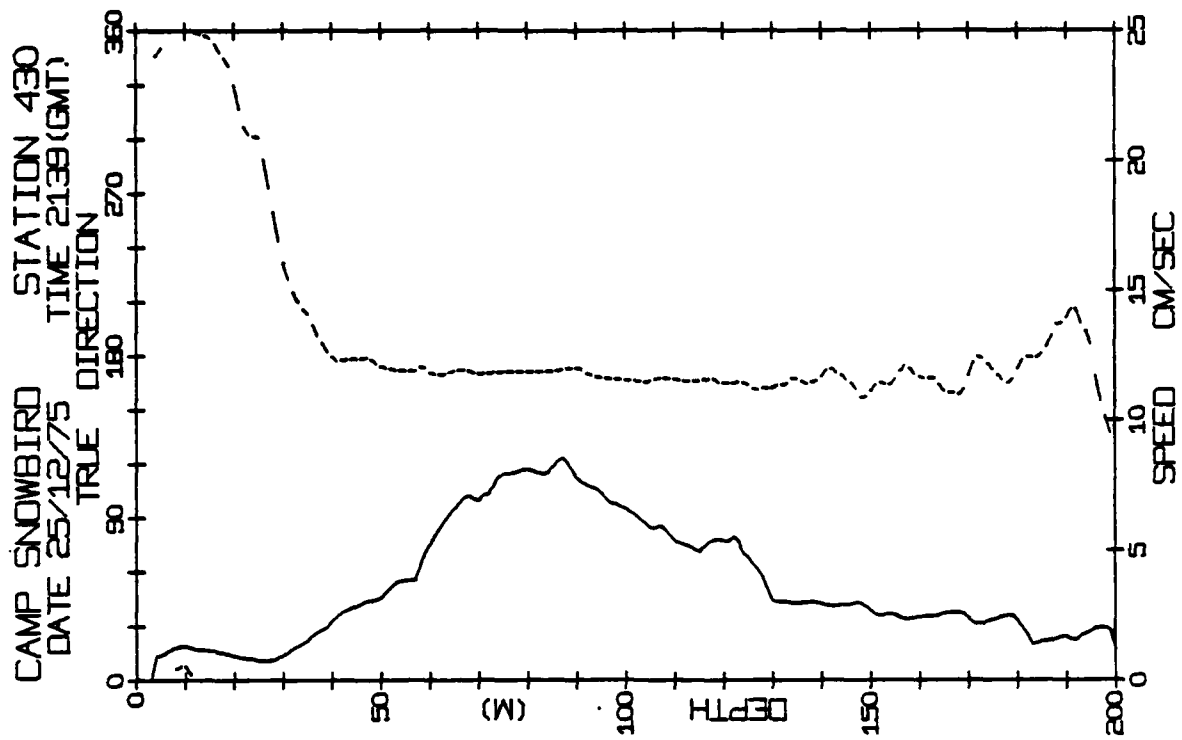
CAMP SNOWBIRD STATION 422
DATE 14/12/75 TIME 606 (GMT)

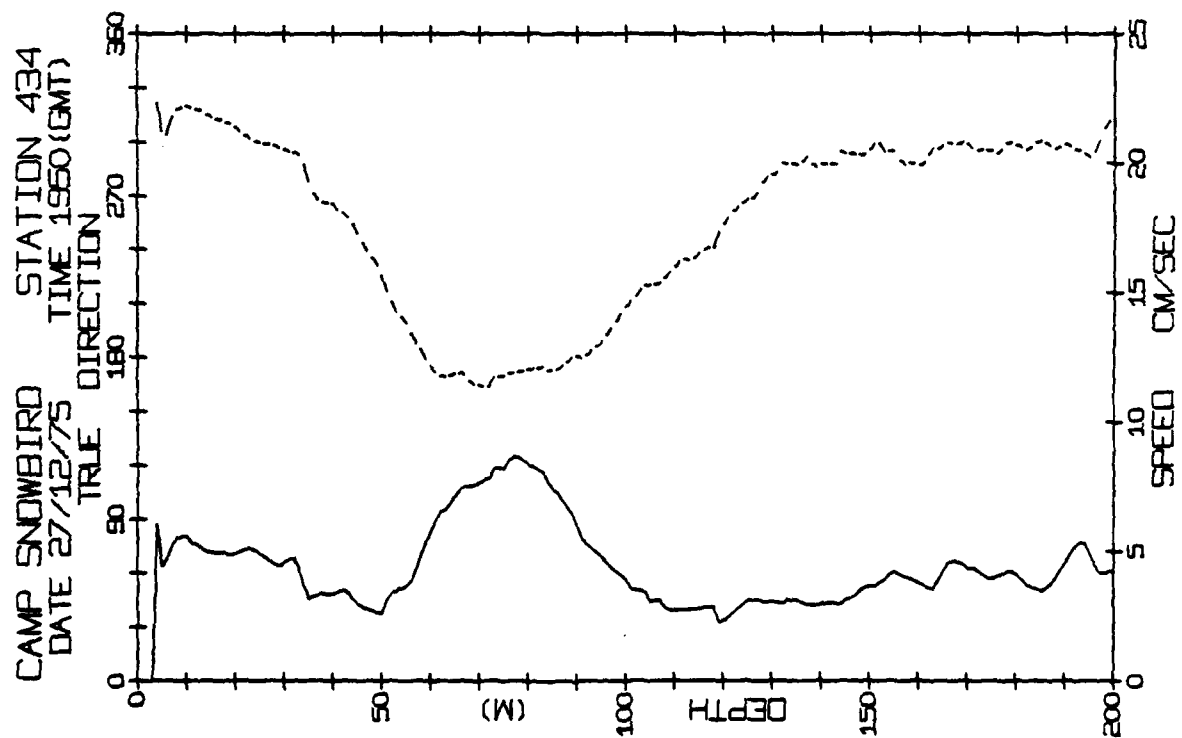
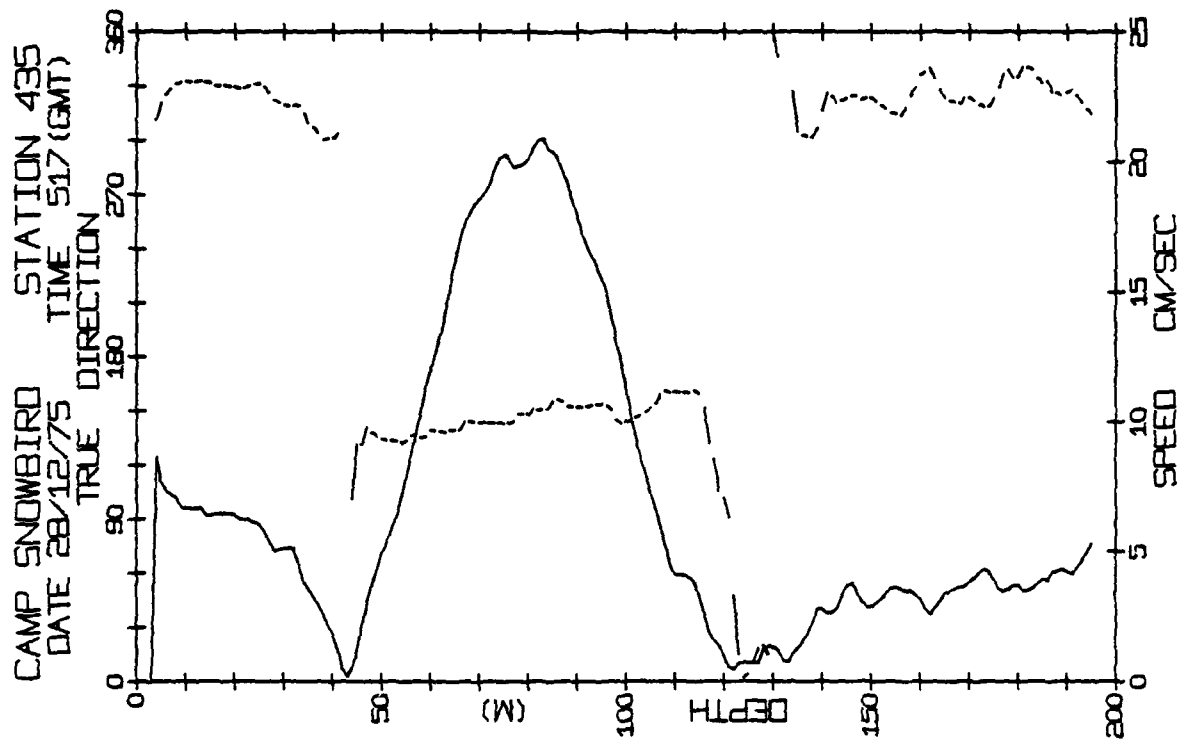


CAMP SNOWBIRD STATION 424
DATE 15/12/75 TIME 512 (GMT)









AD-A109 990

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY PALISADES NY F/6 8/3
ARCTIC ICE DYNAMICS JOINT EXPERIMENT 1975-1976 PHYSICAL OCEANOGRAPHY--ETC(U)
FEB 80 T O MANLEY, K HUNKINS, W TIEMANN N00014-76-C-0004
LD60-CU-6-80 NL

UNCLASSIFIED

5 of 5

APR 6 1980

DTIC

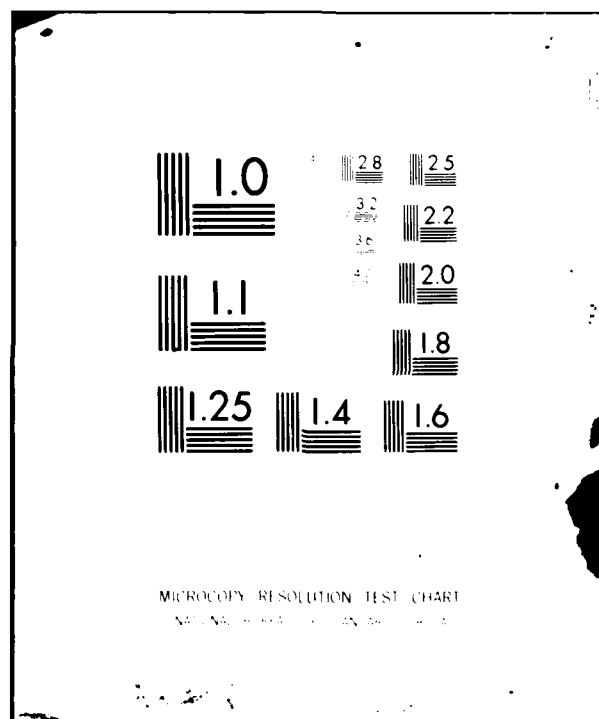
END

DATE

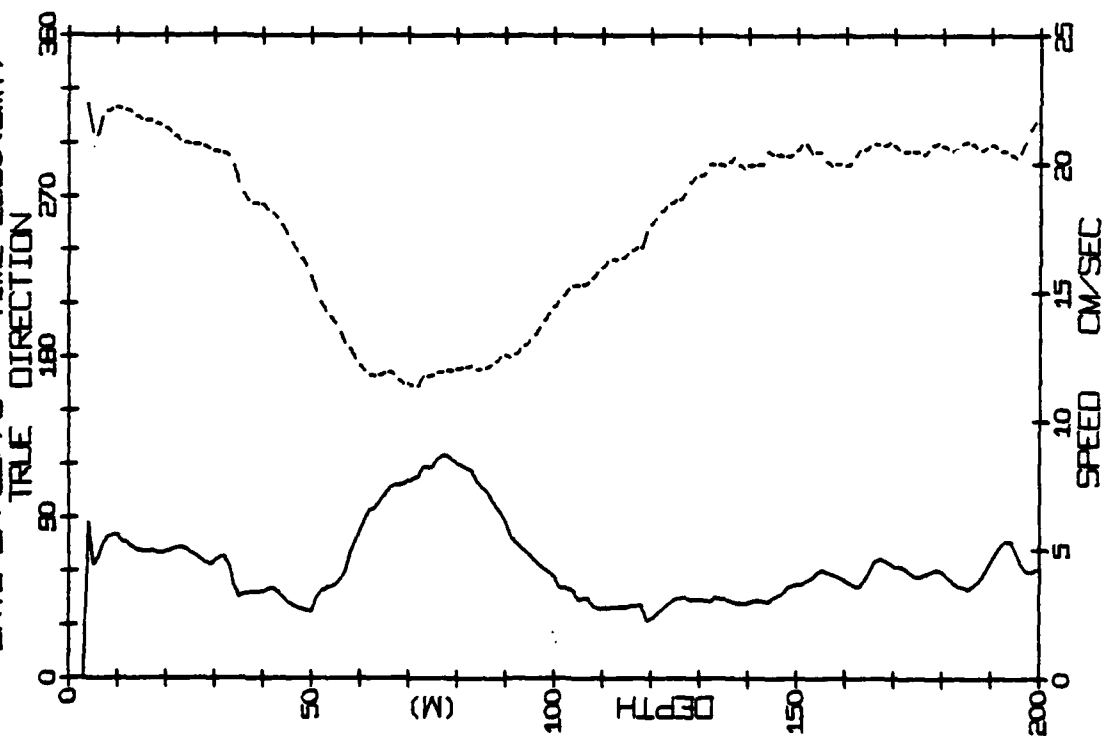
FILMED

02-82

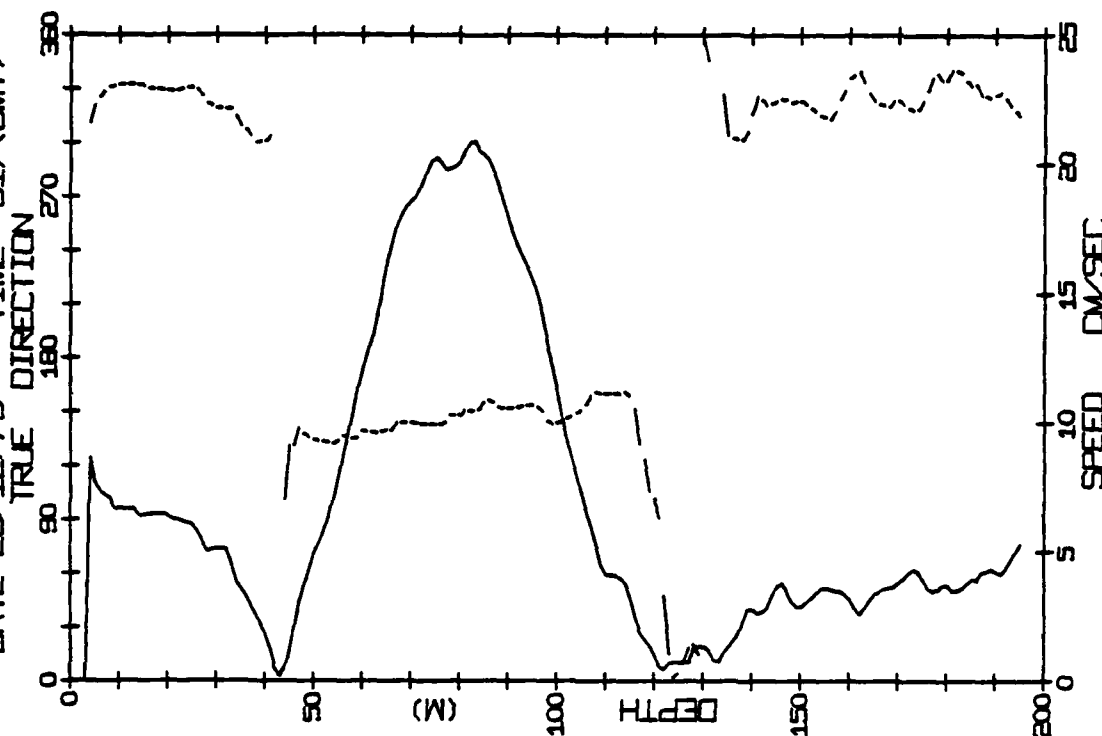
DTIC

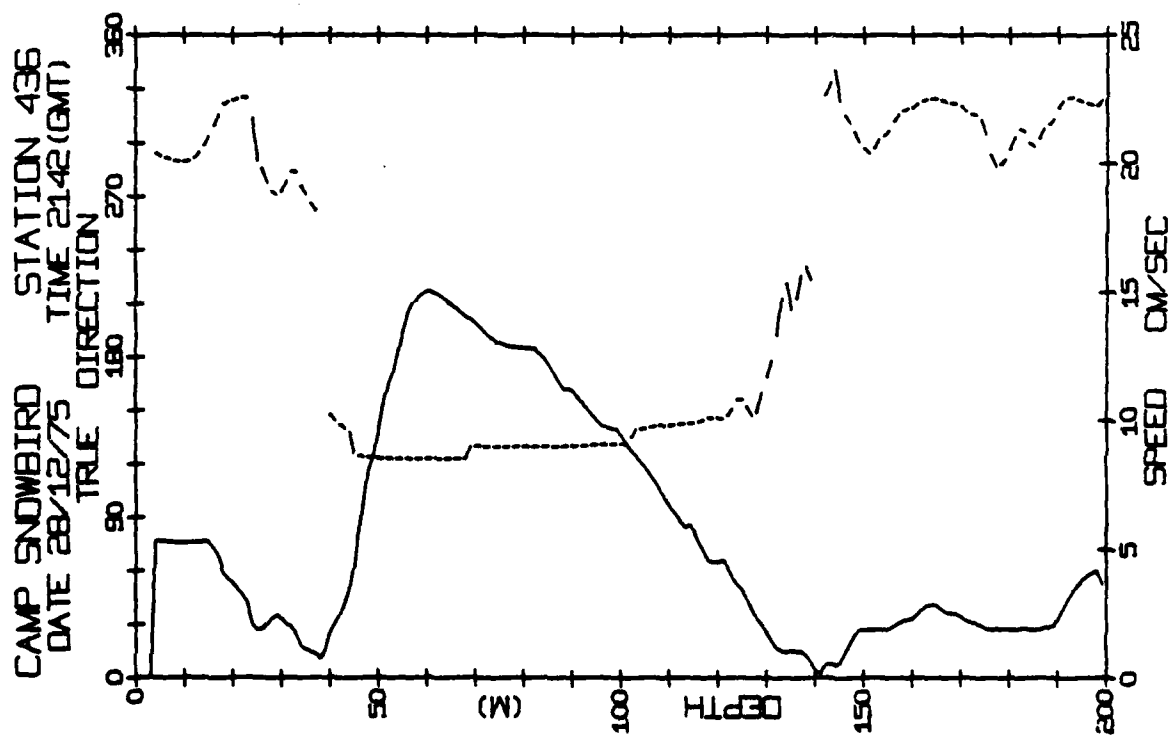
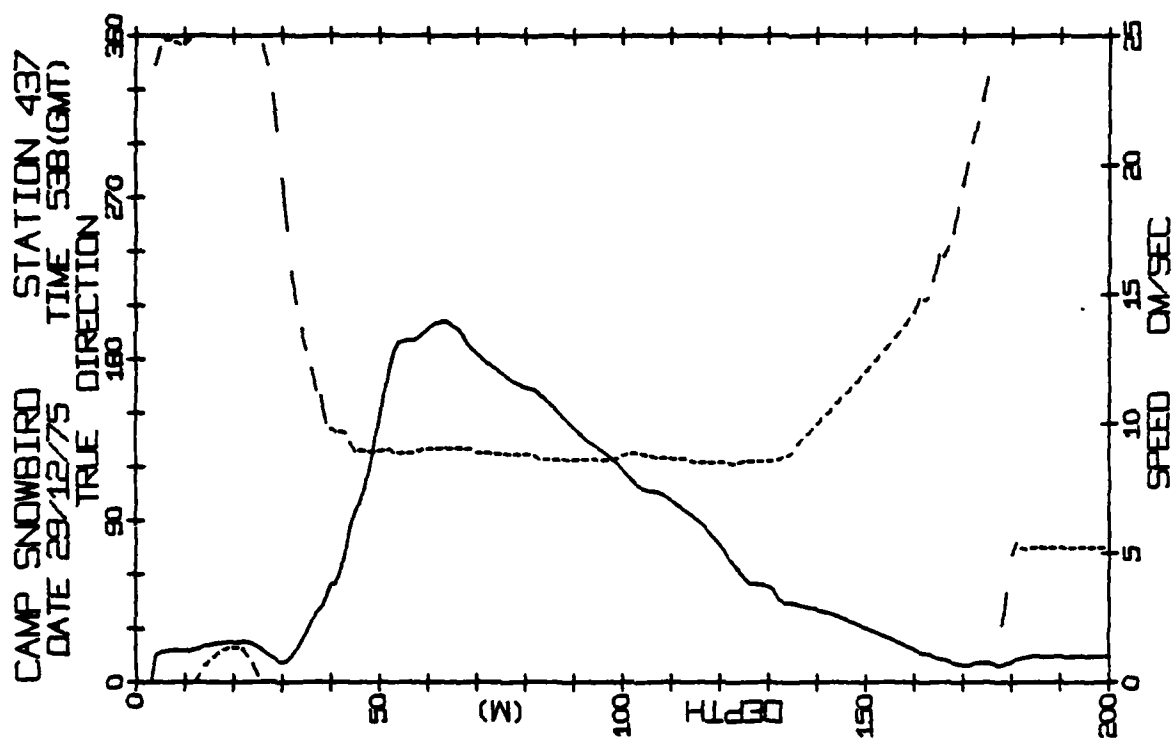


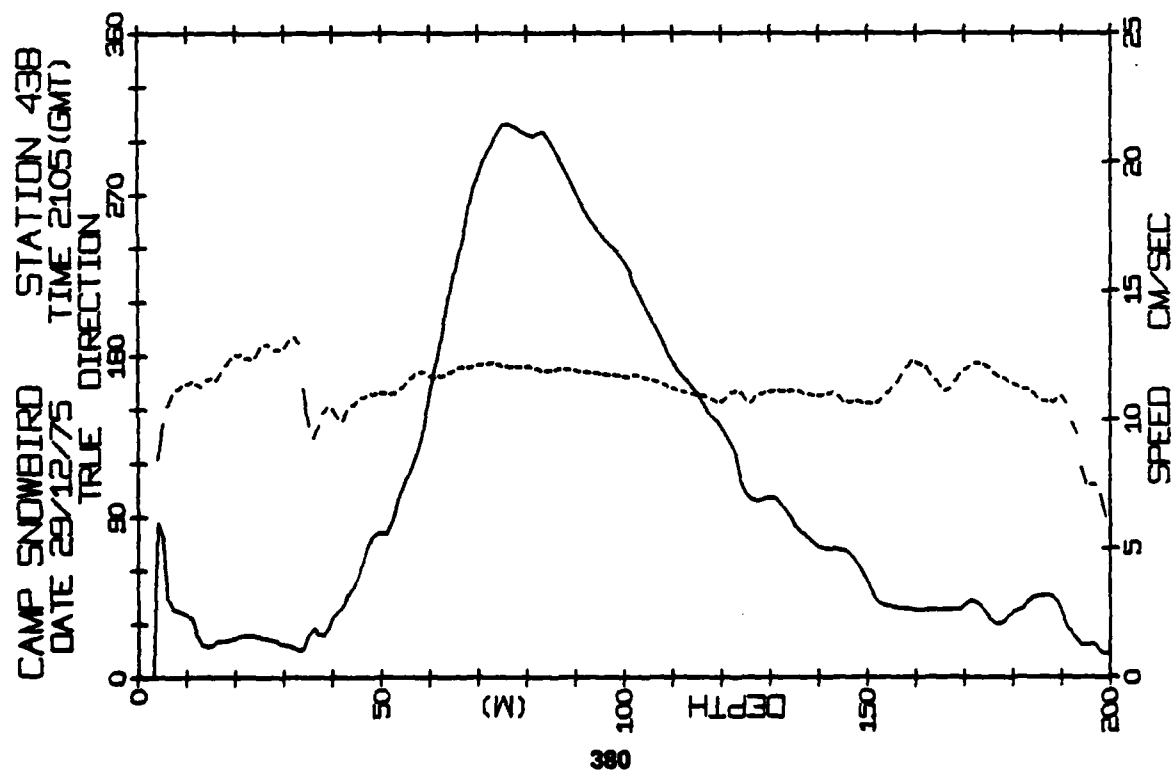
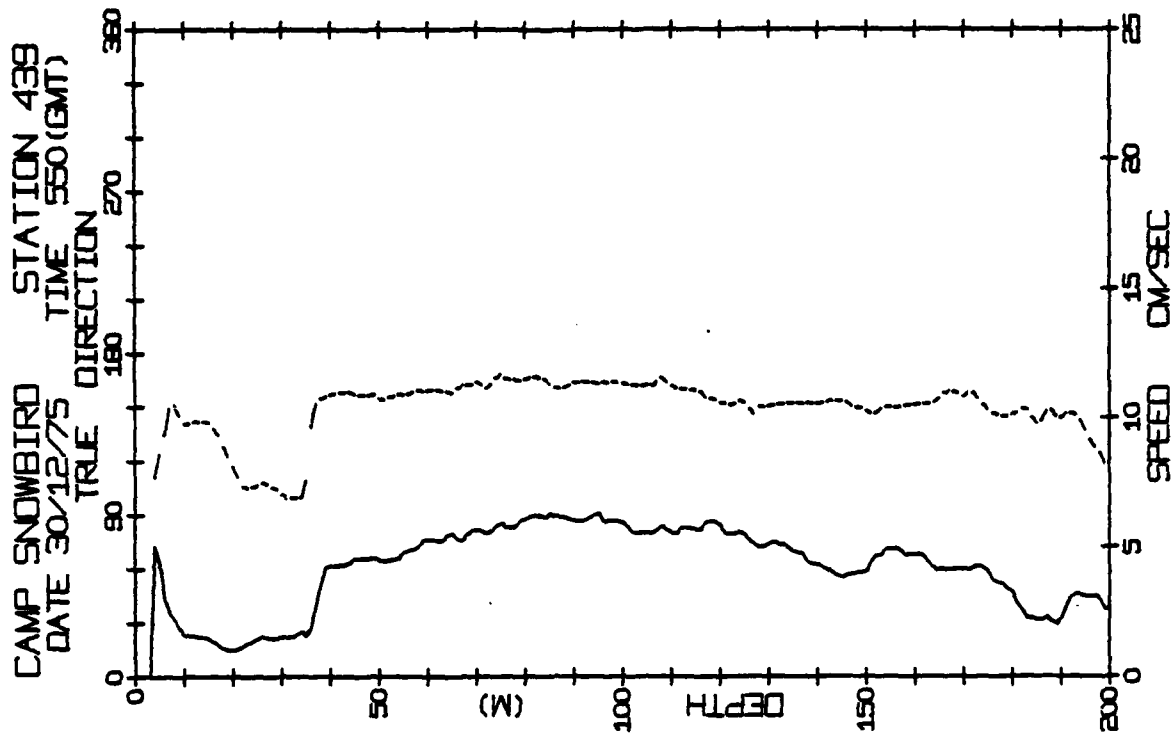
CAMP SNOWBIRD STATION 434
DATE 27/12/75 TIME 1950 (GMT)

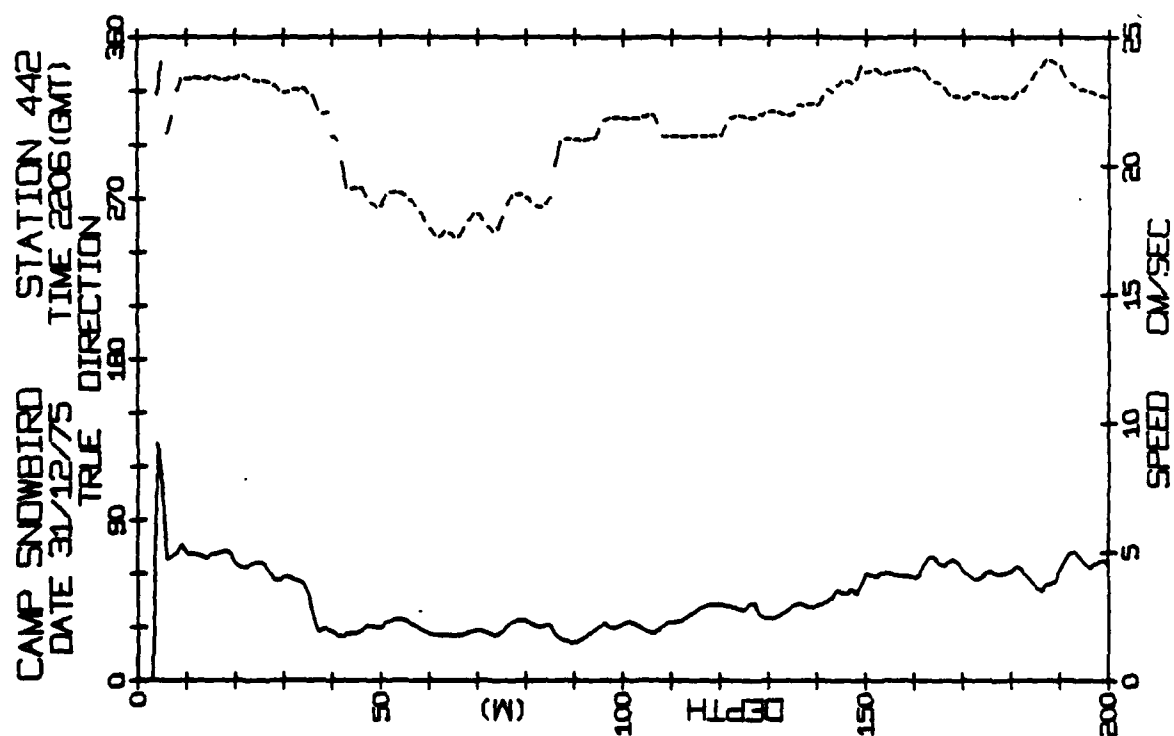
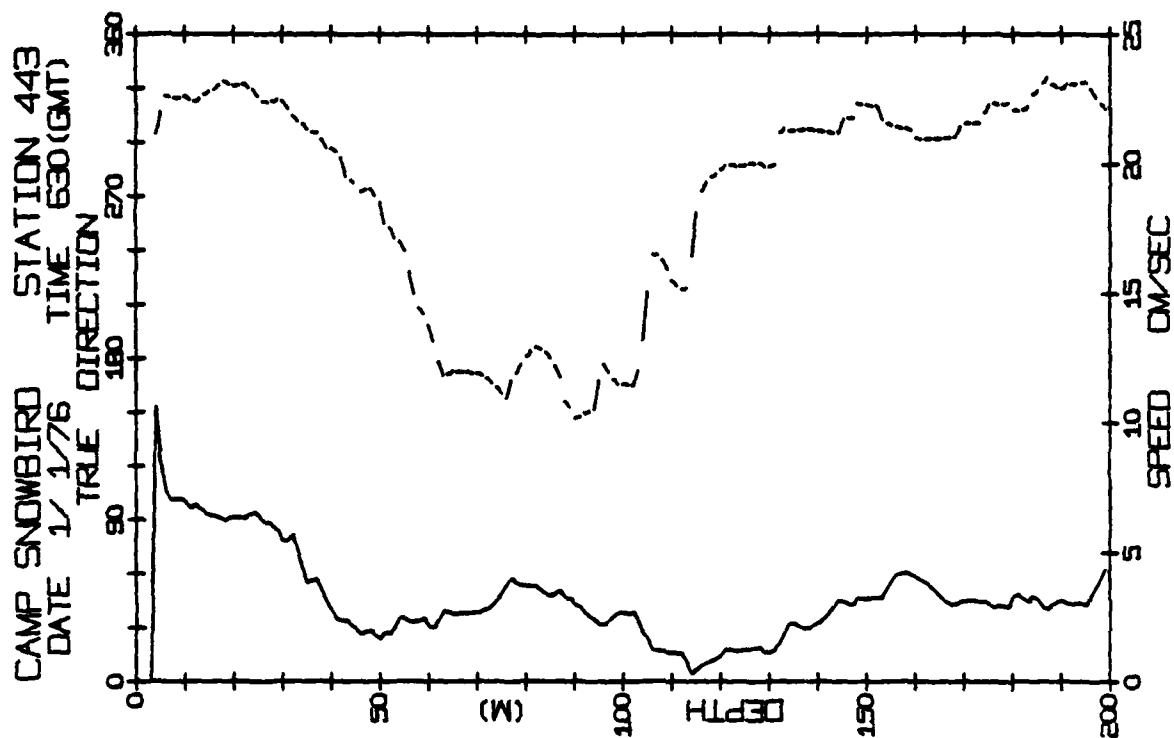


CAMP SNOWBIRD STATION 435
DATE 28/12/75 TIME 517 (GMT)



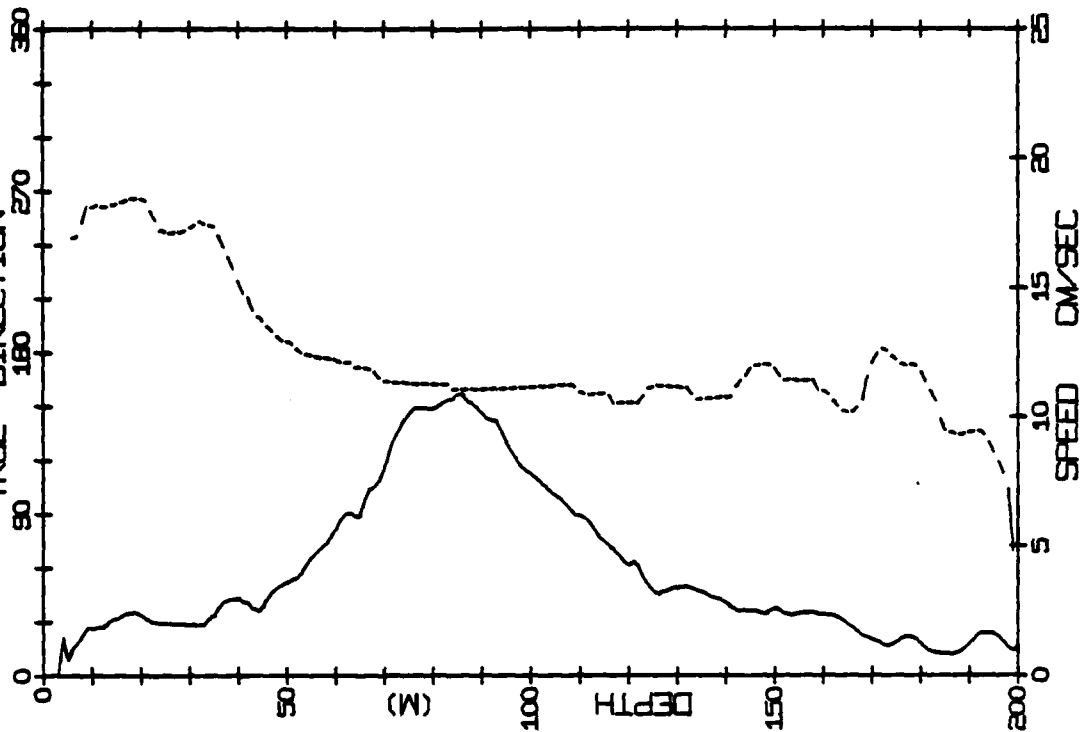






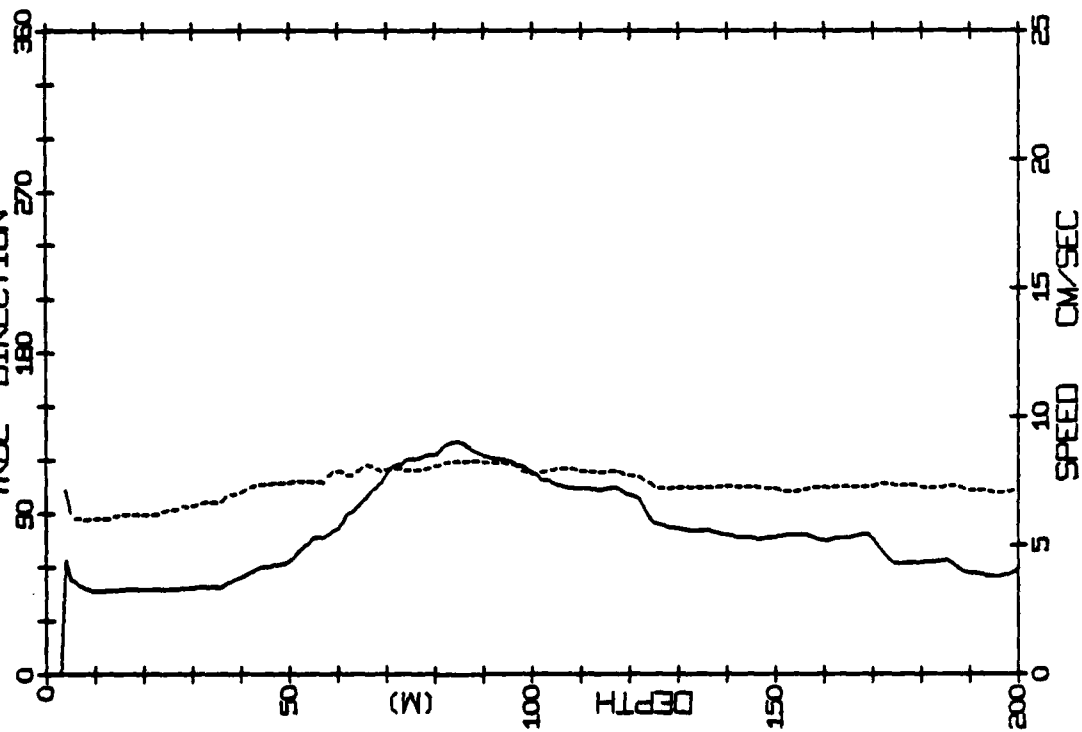
CAMP SNOWBIRD STATION 445
DATE 2/1/76 TIME 617 (GMT)

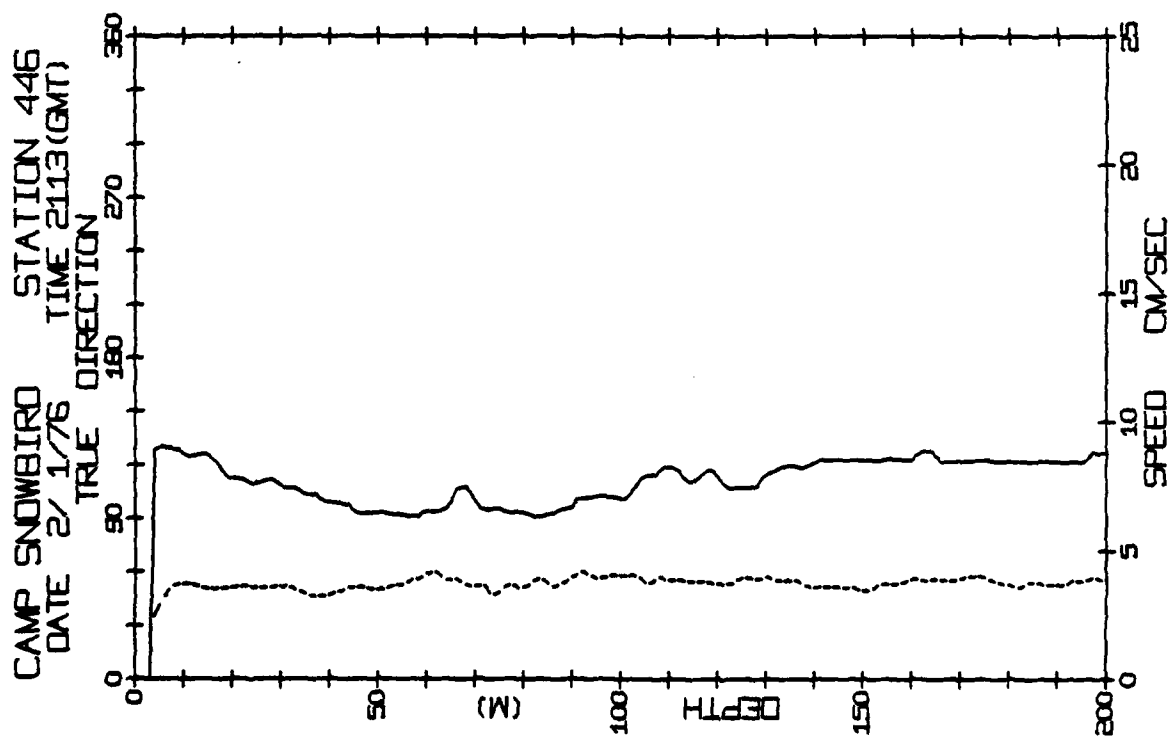
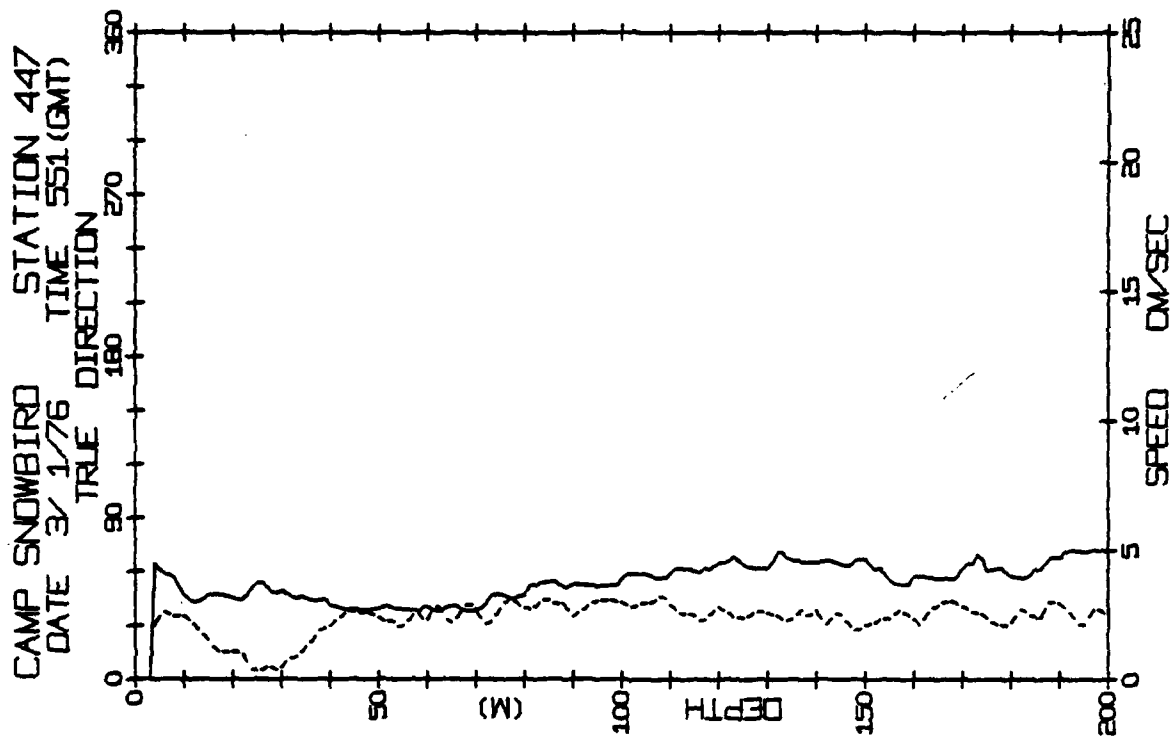
TRUE DIRECTION

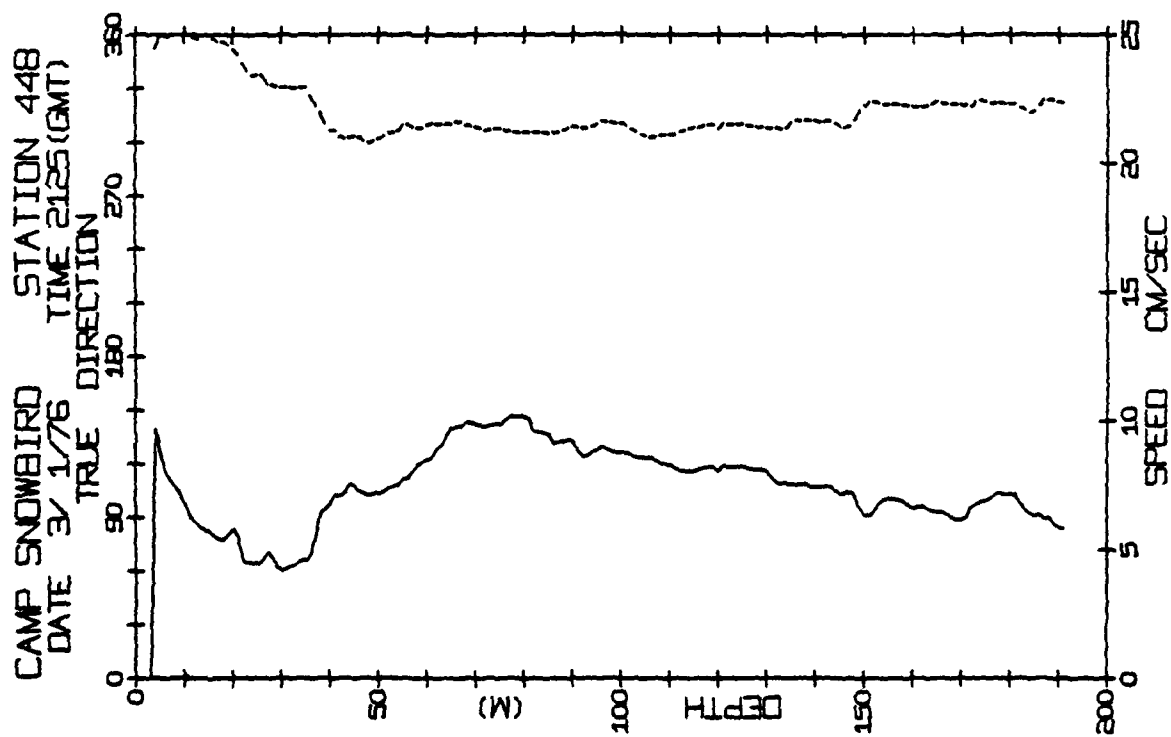
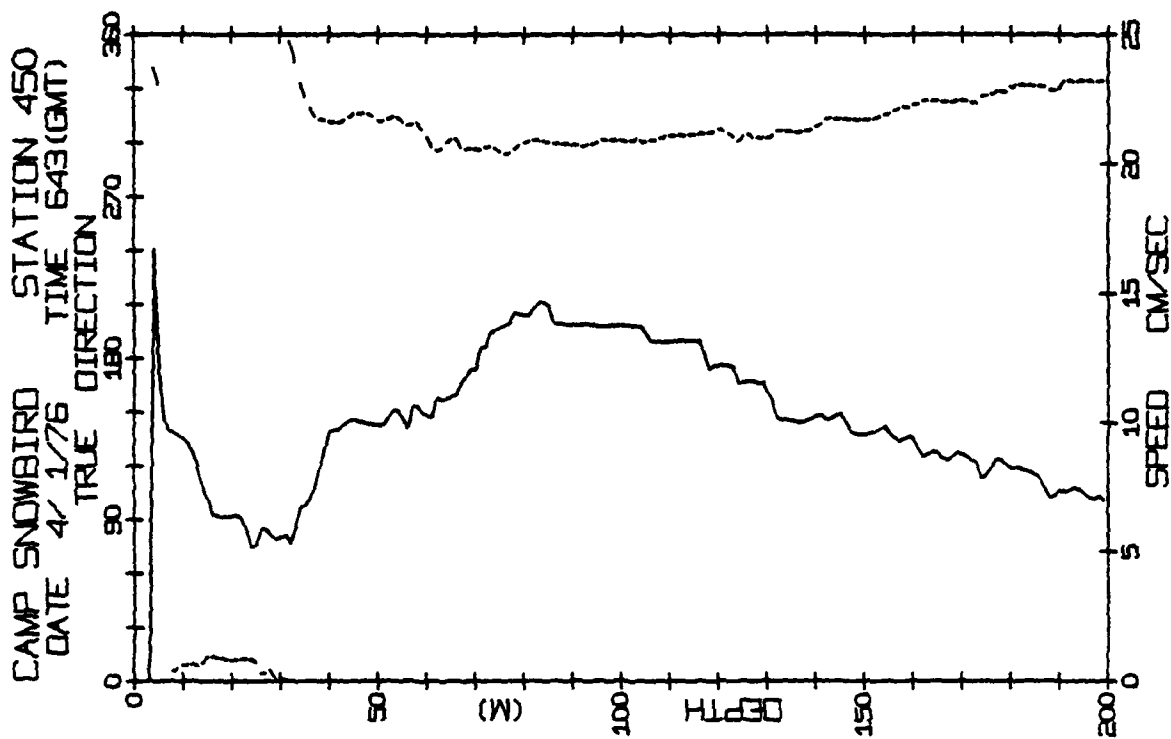


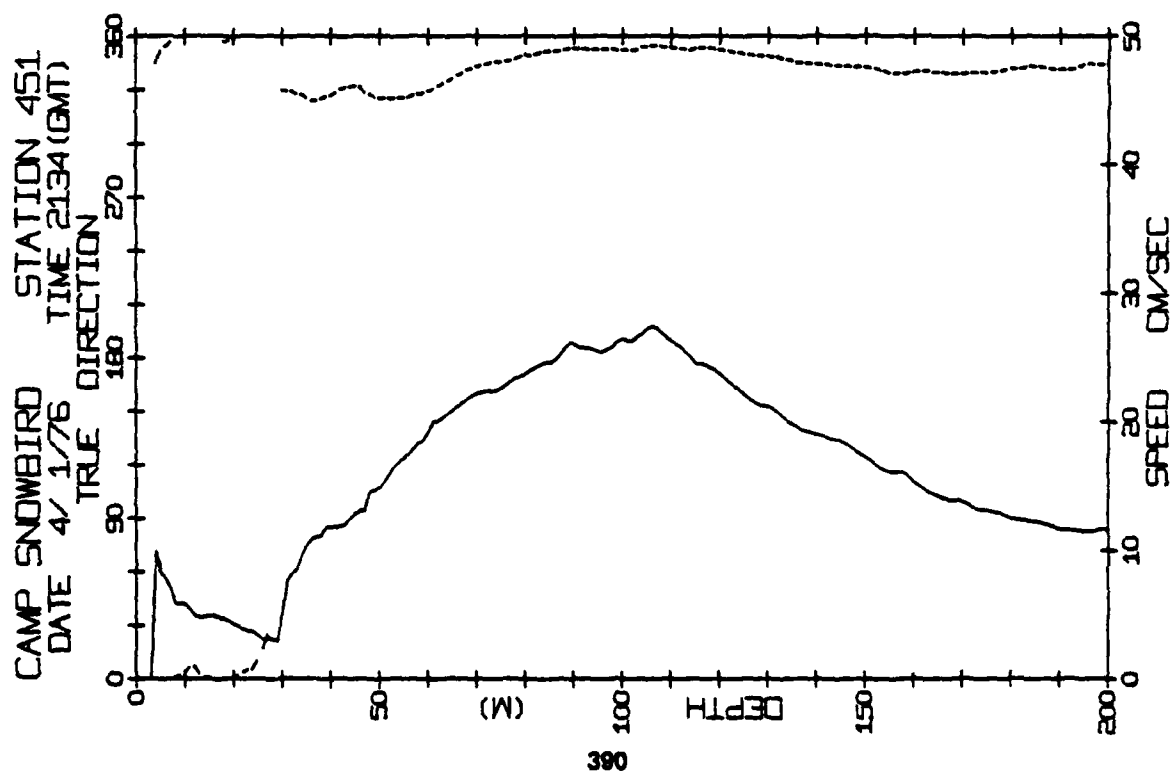
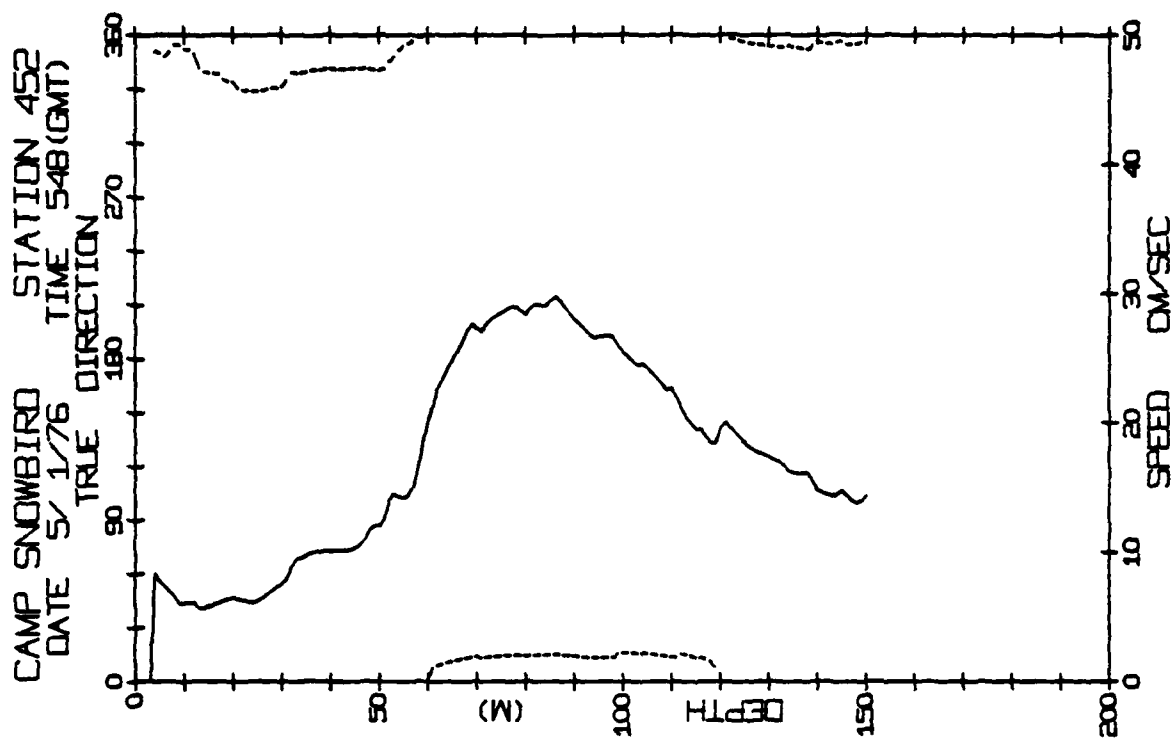
CAMP SNOWBIRD STATION 444
DATE 1/1/76 TIME 2351 (GMT)

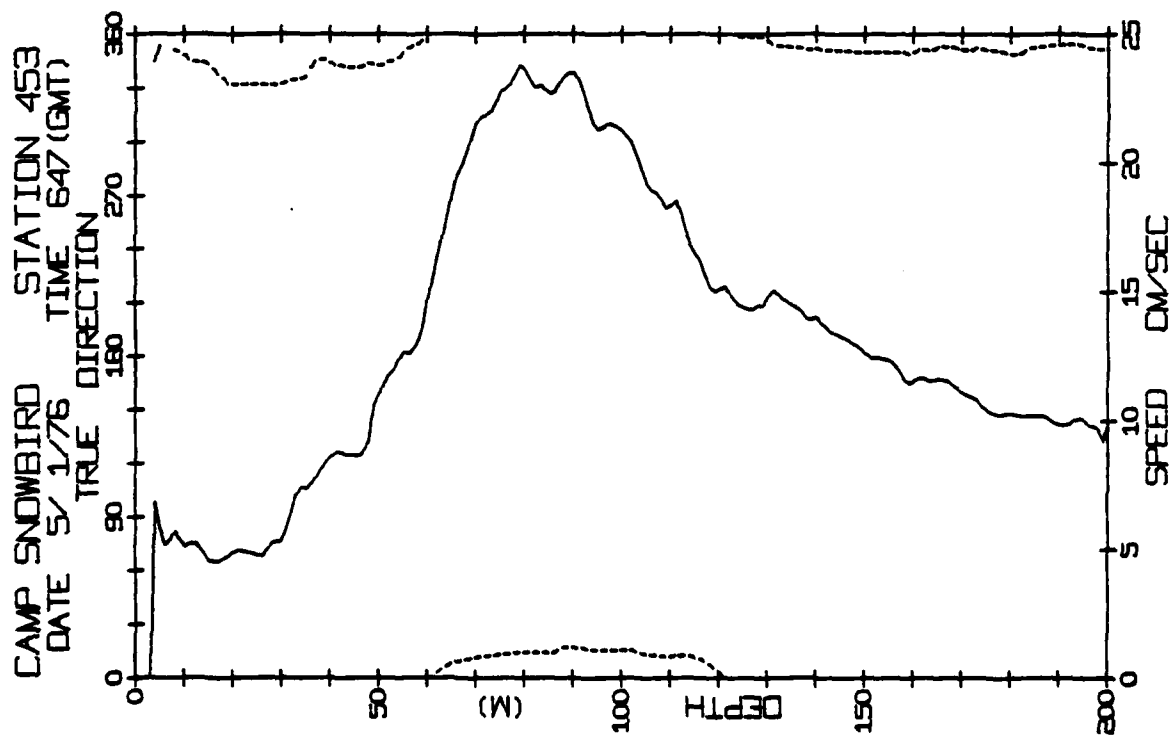
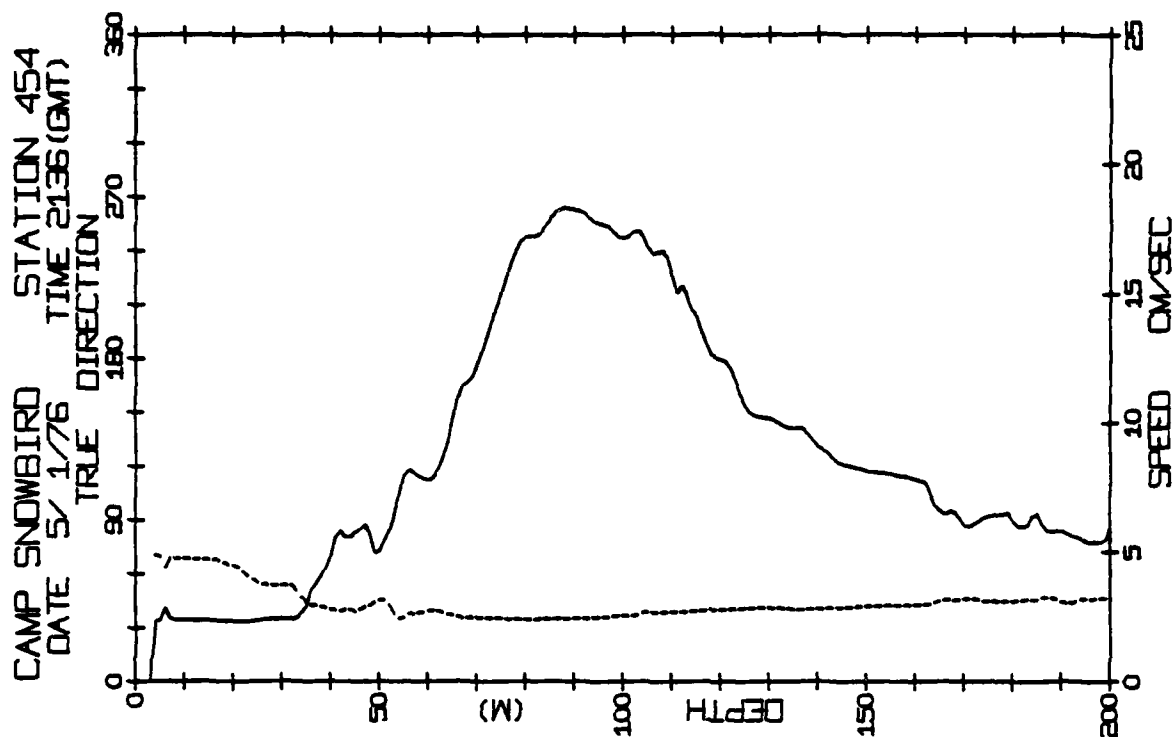
TRUE DIRECTION



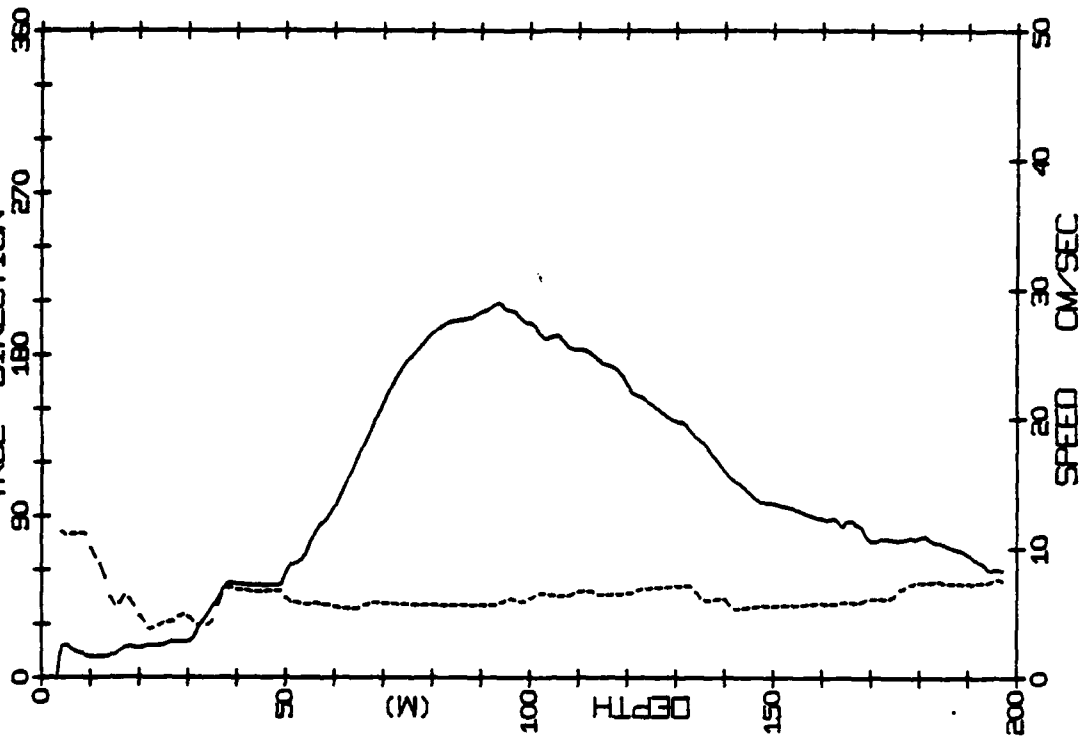




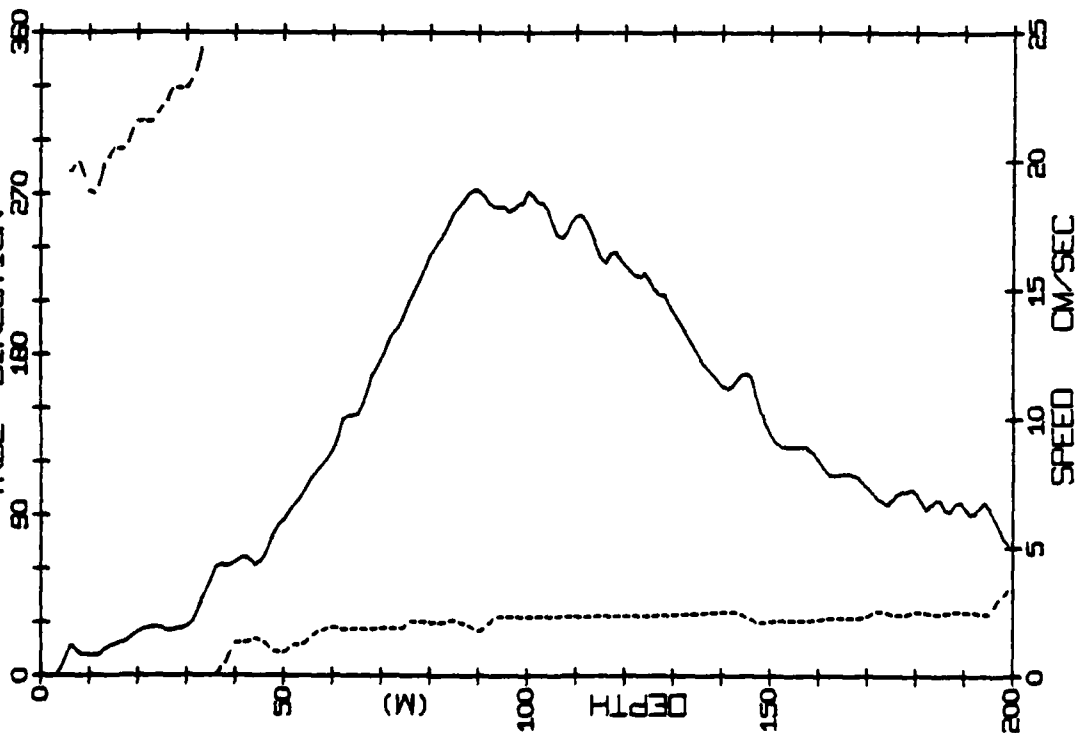




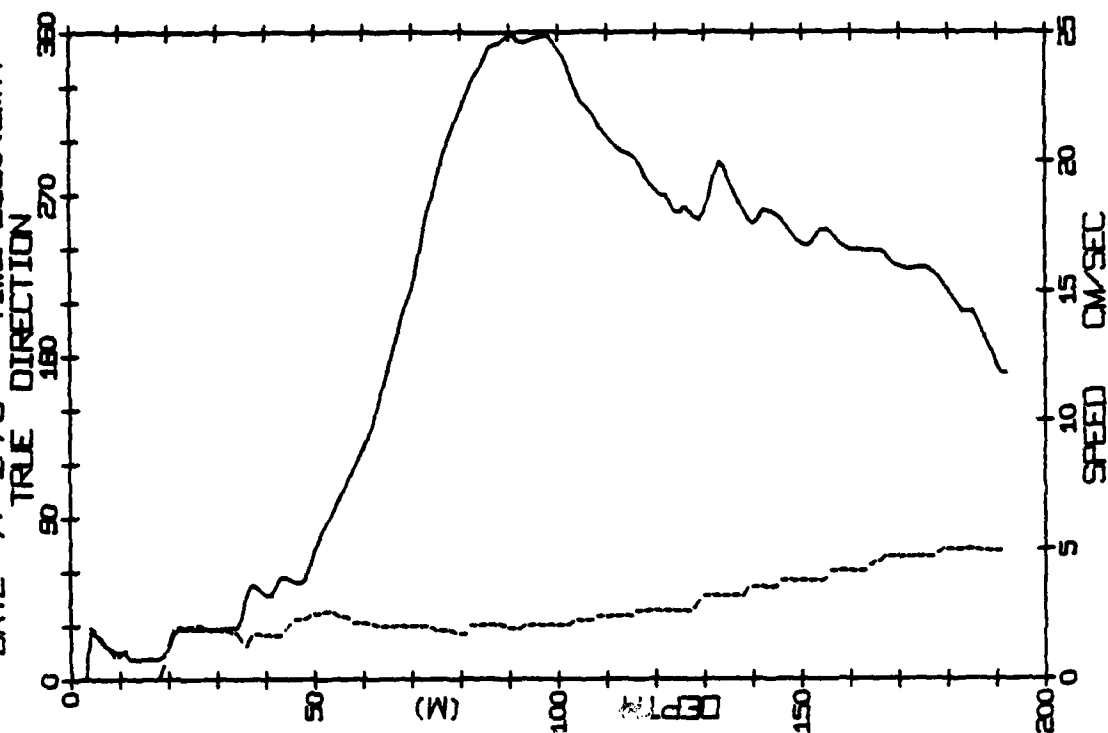
CAMP SNOWBIRD STATION 455
 DATE 6/1/76 TIME 2134(GMT)
 TRUE DIRECTION



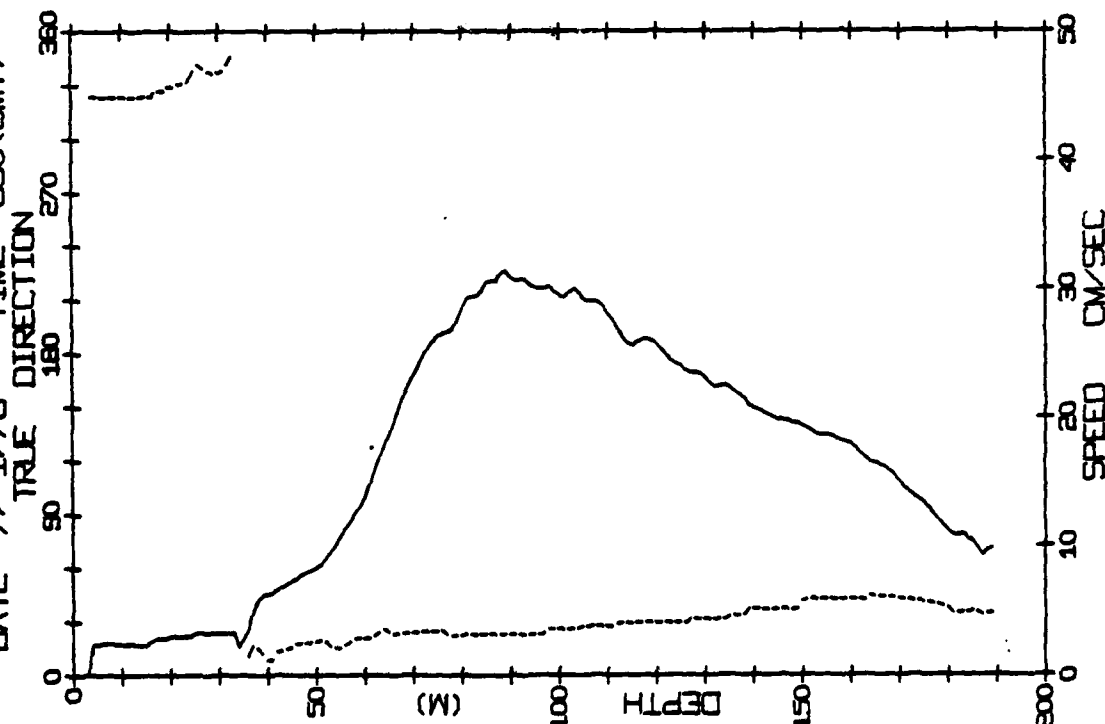
CAMP SNOWBIRD STATION 455
 DATE 6/1/76 TIME 553(GMT)
 TRUE DIRECTION



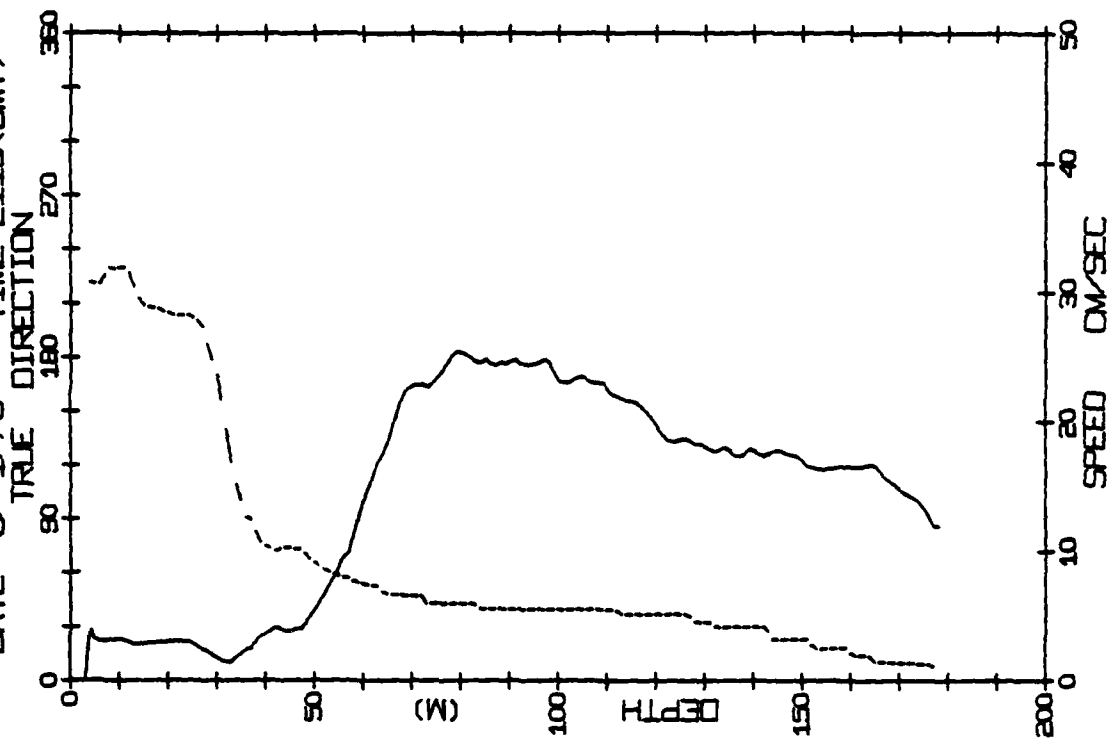
CAMP SNOWBIRD STATION 458
DATE 7/1/76 TIME 2130 (GMT)



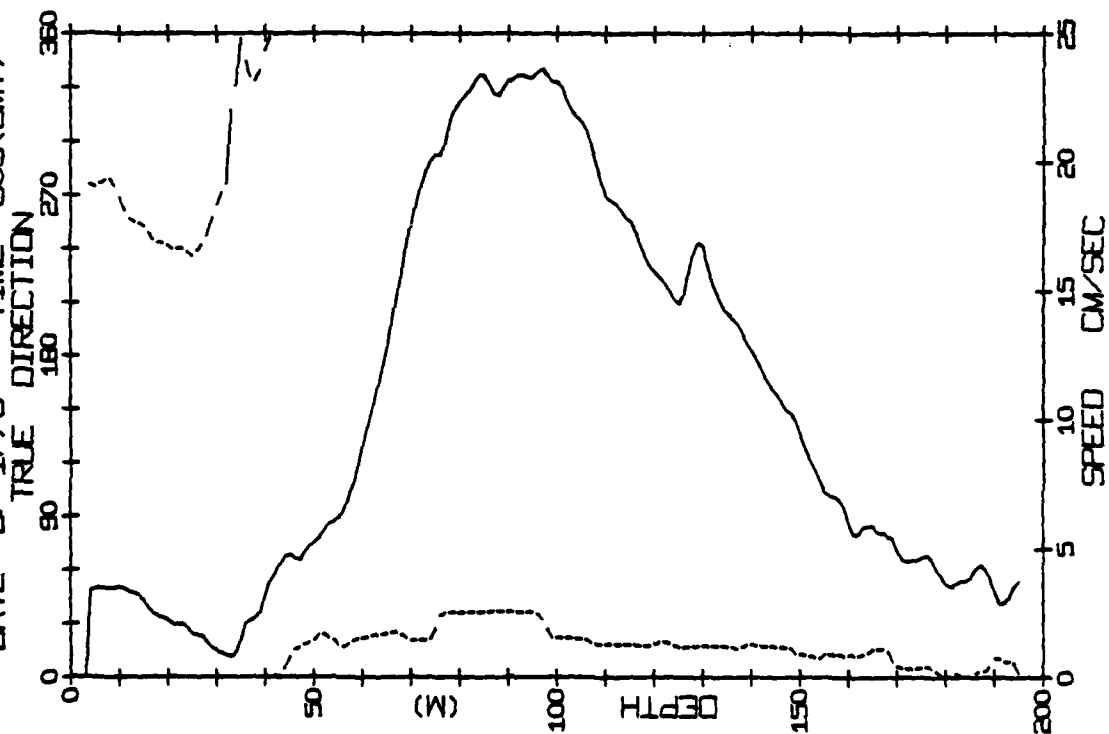
CAMP SNOWBIRD STATION 457
DATE 7/1/76 TIME 630 (GMT)



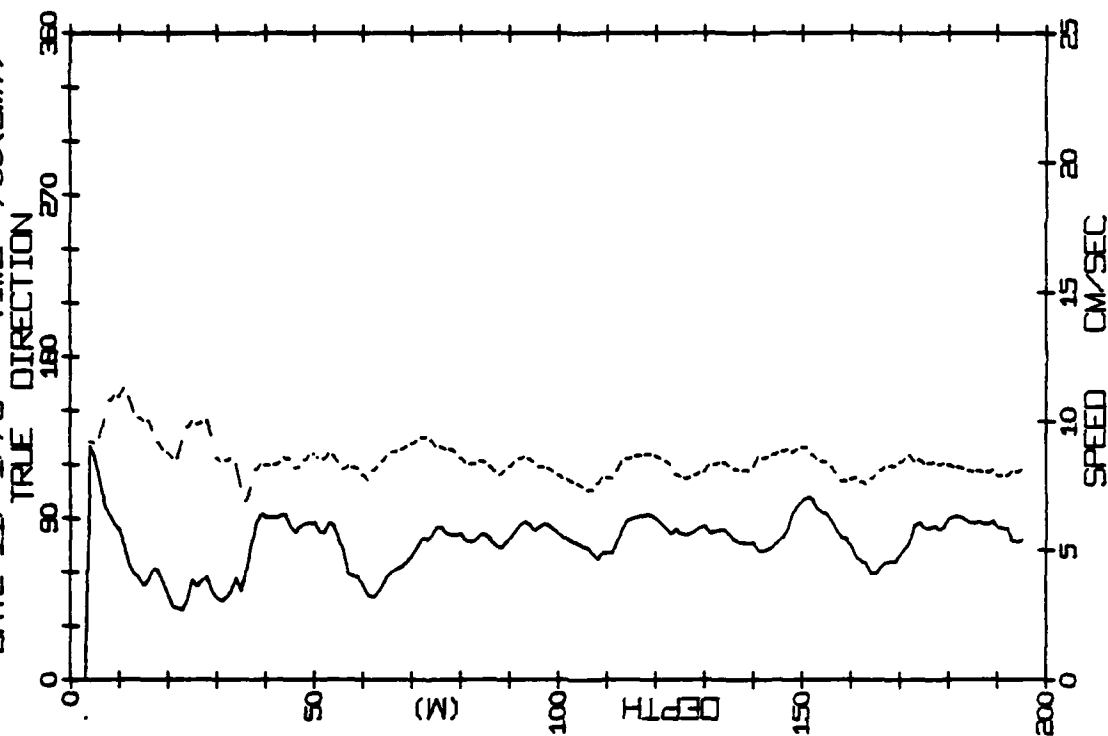
CAMP SNOWBIRD STATION 460
DATE 8/1/76 TIME 2115 (GMT)



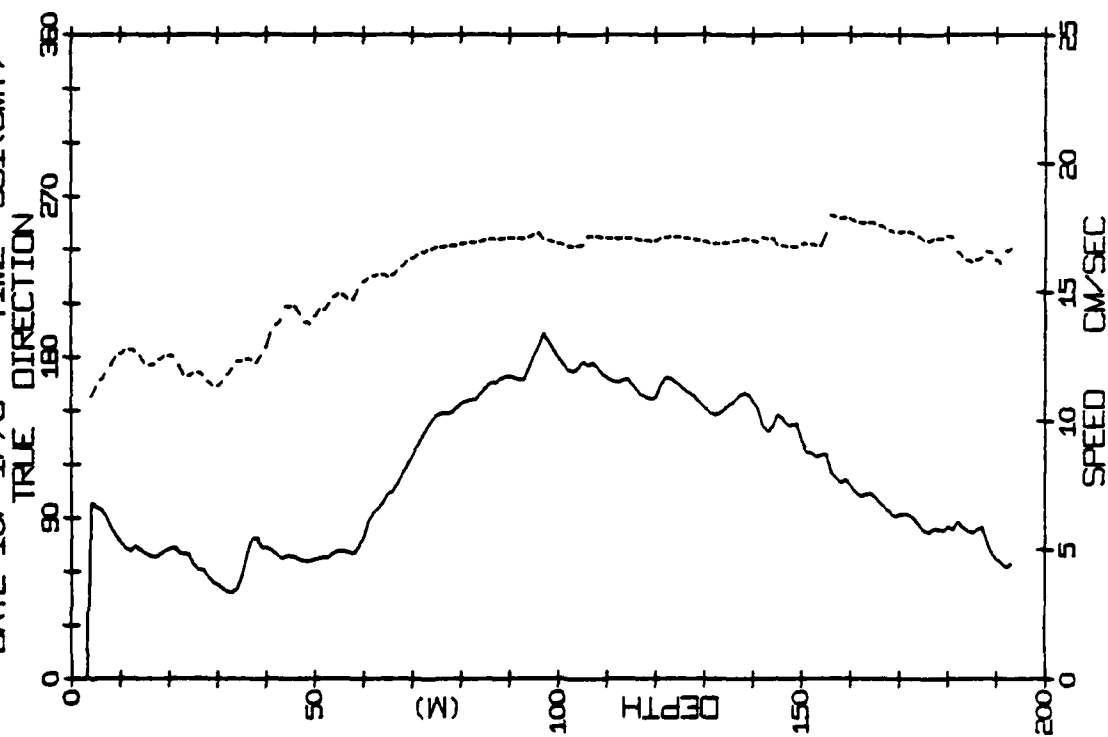
CAMP SNOWBIRD STATION 459
DATE 8/1/76 TIME 603 (GMT)

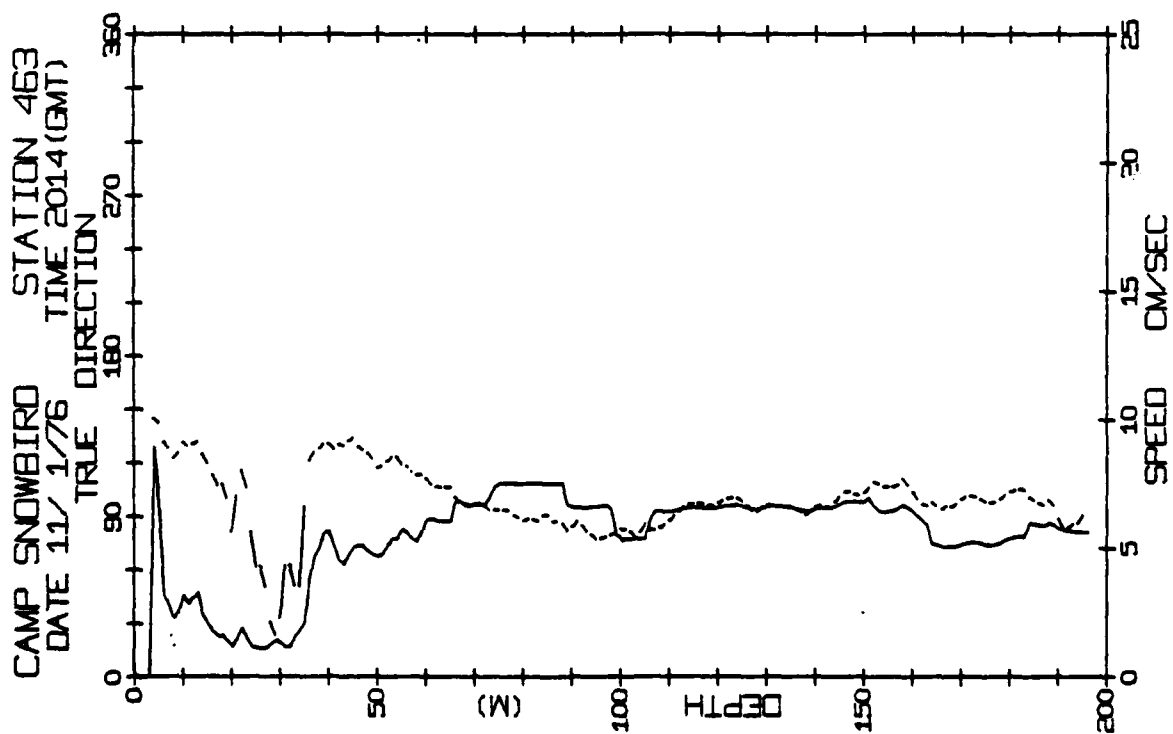
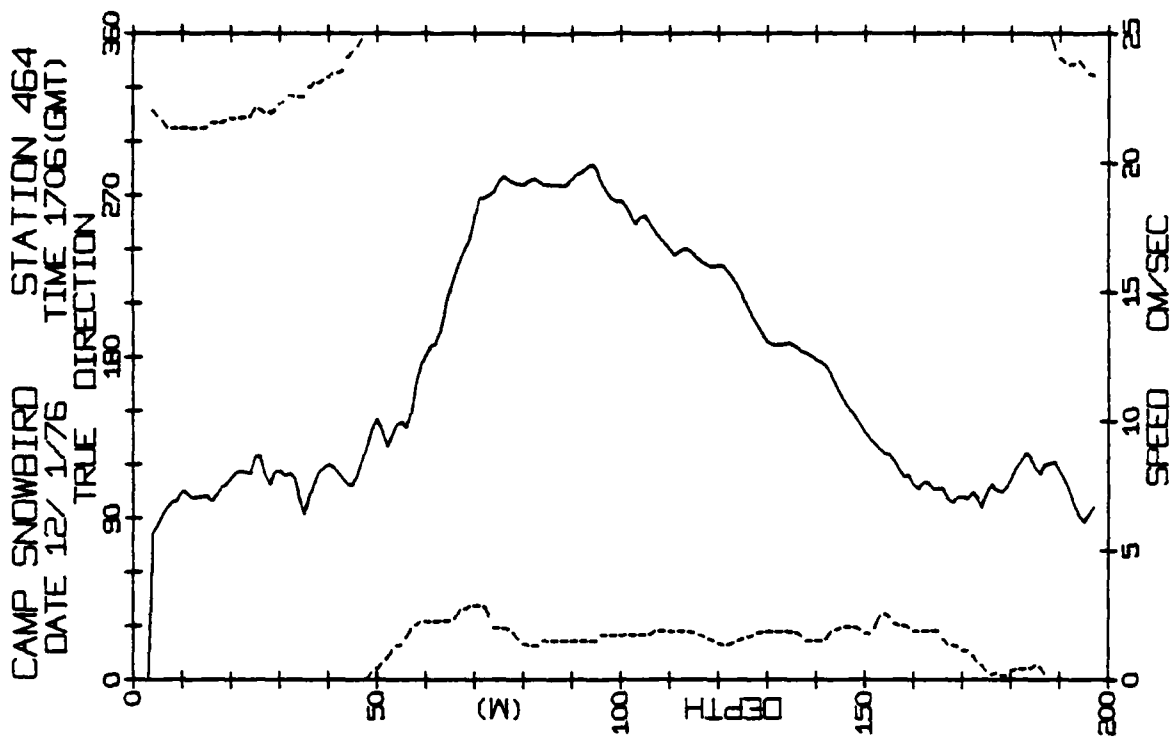


CAMP SNOWBIRD STATION 462
DATE 11/ 1/76 TIME 700(GMT)

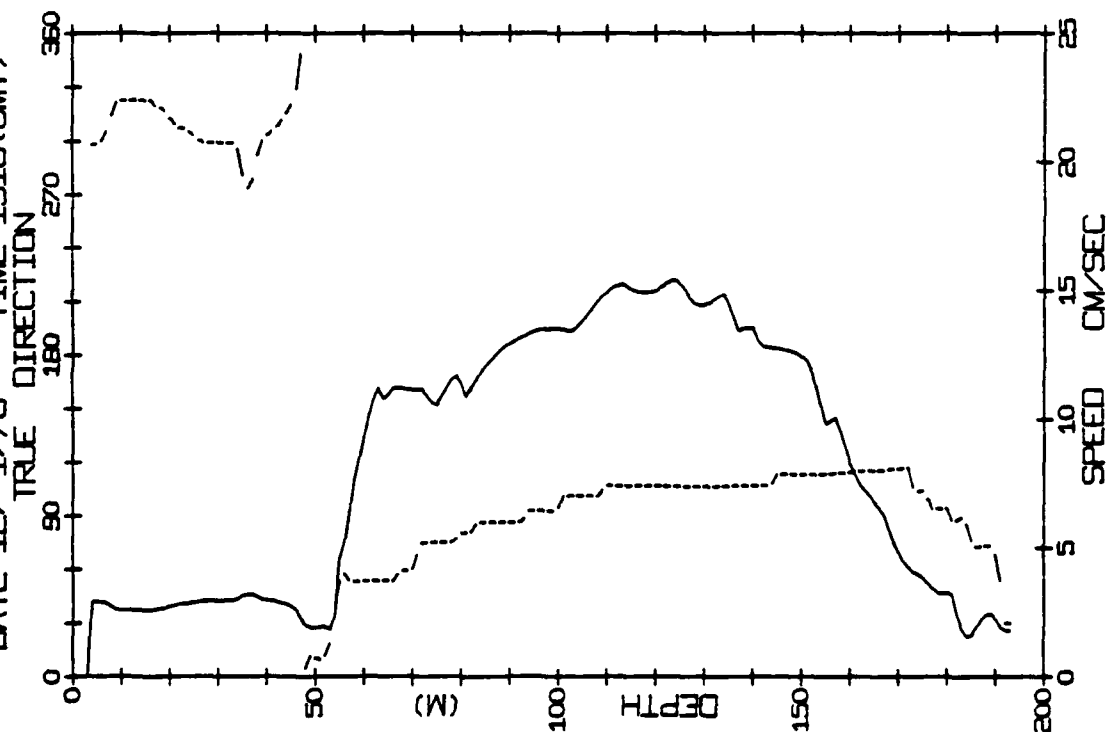


CAMP SNOWBIRD STATION 461
DATE 10/ 1/76 TIME 551(GMT)

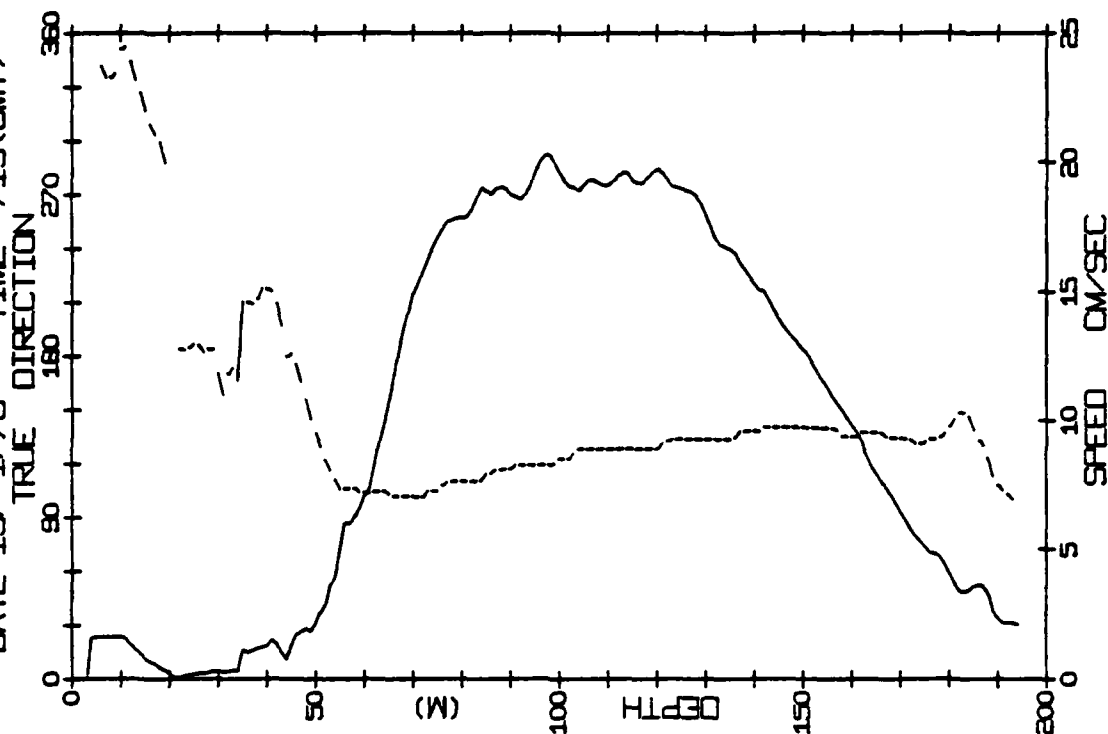




CAMP SNOWBIRD STATION 465
DATE 12/ 1/76 TIME 1918(GMT)



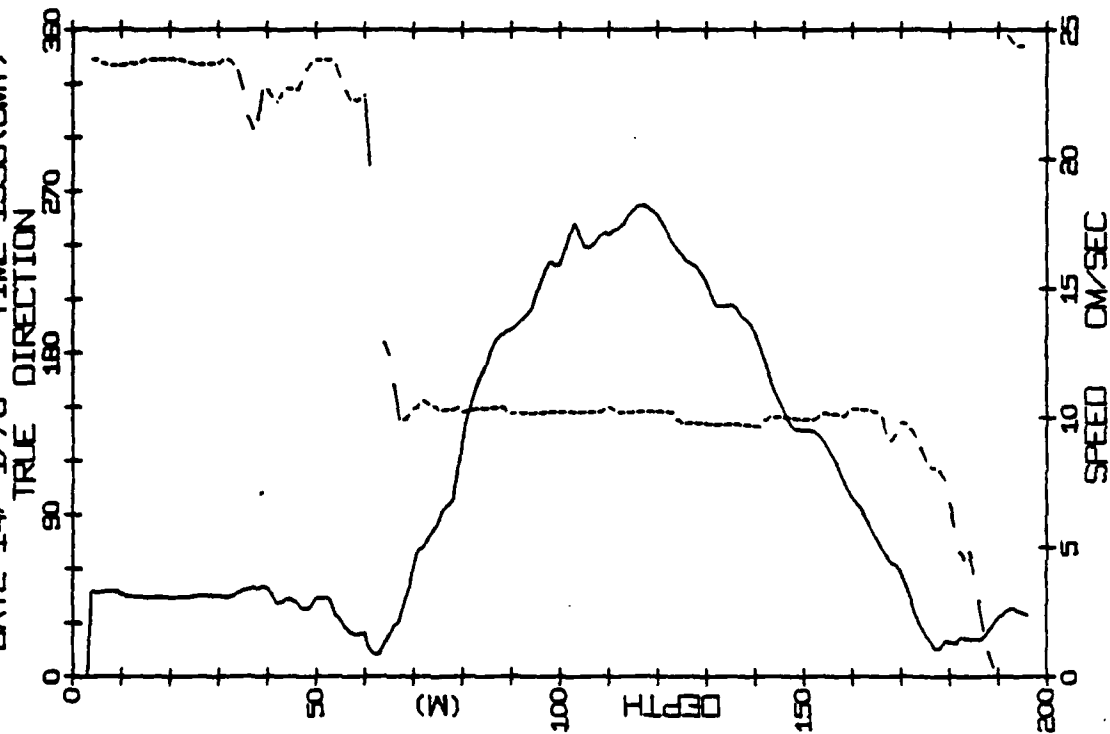
CAMP SNOWBIRD STATION 466
DATE 13/ 1/76 TIME 713(GMT)



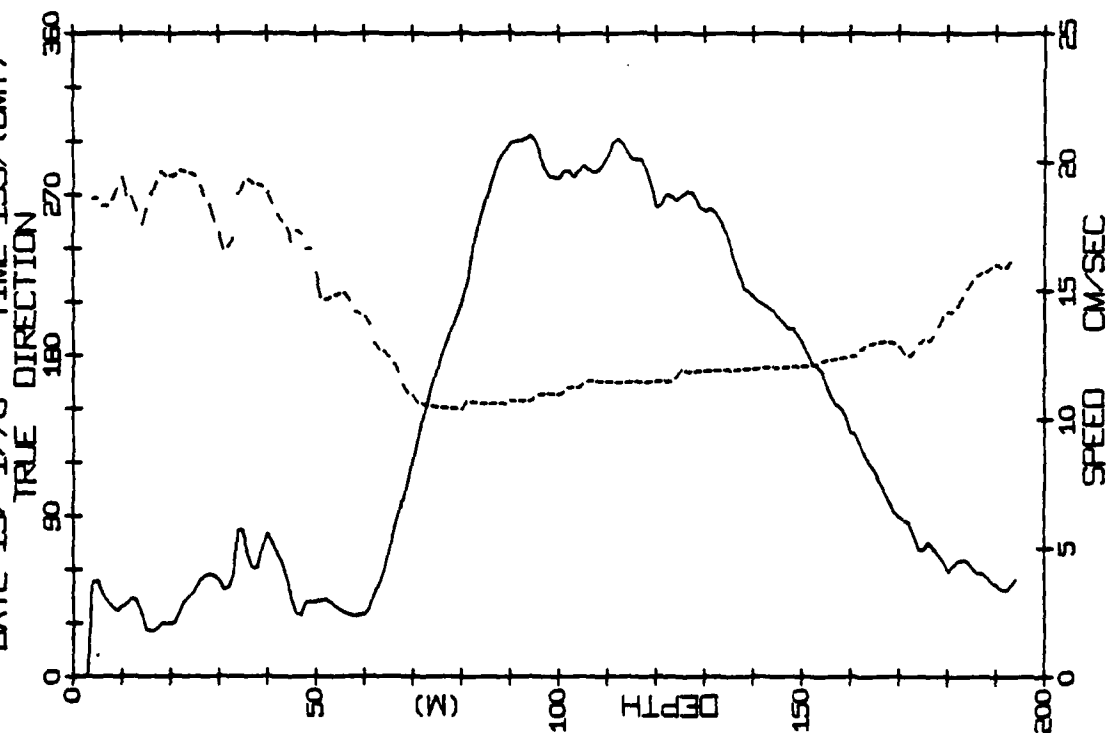
SNOWBIRD STATION 465 (193M.) 12/JAN/76 1918 GMT
LAT= 73 9602N LONG= 145 1033W LTER= 1 LOER= 1
NINVEL= -01 EIVEL= -09 NVER= 0 EVER= 0

[illegible][illegible]

CAMP SNOWBIRD STATION 468
 DATE 14/ 1/76 TIME 1958 (GMT)



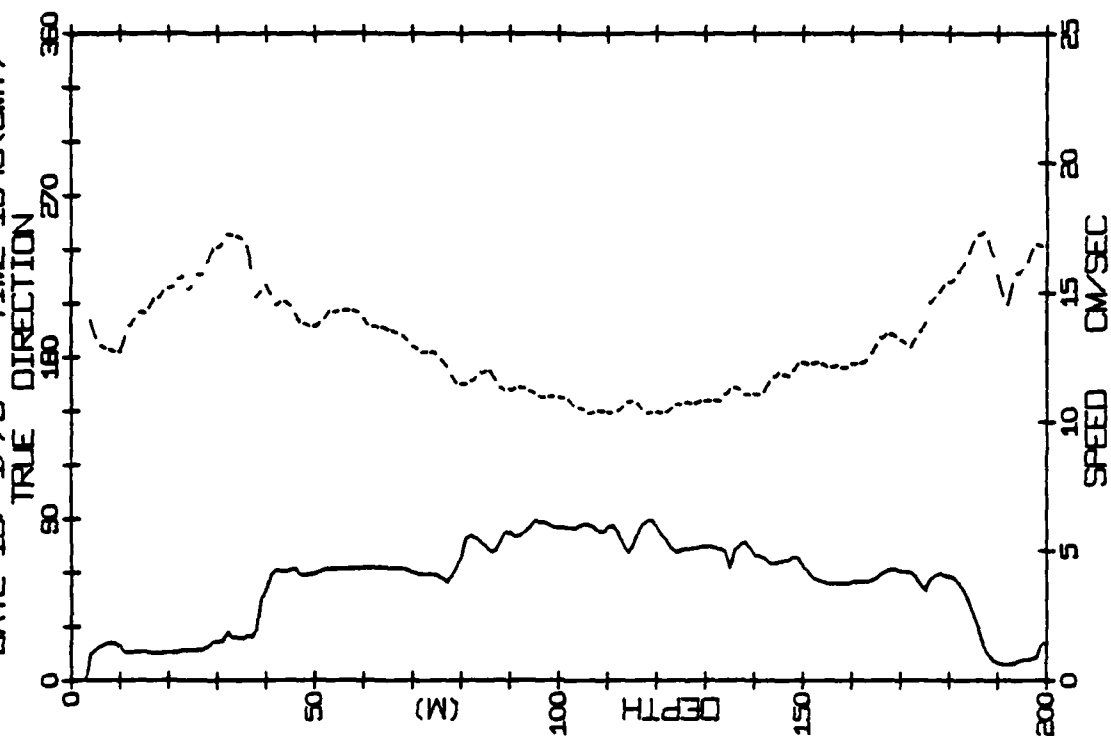
CAMP SNOWBIRD STATION 467
 DATE 13/ 1/76 TIME 1957 (GMT)



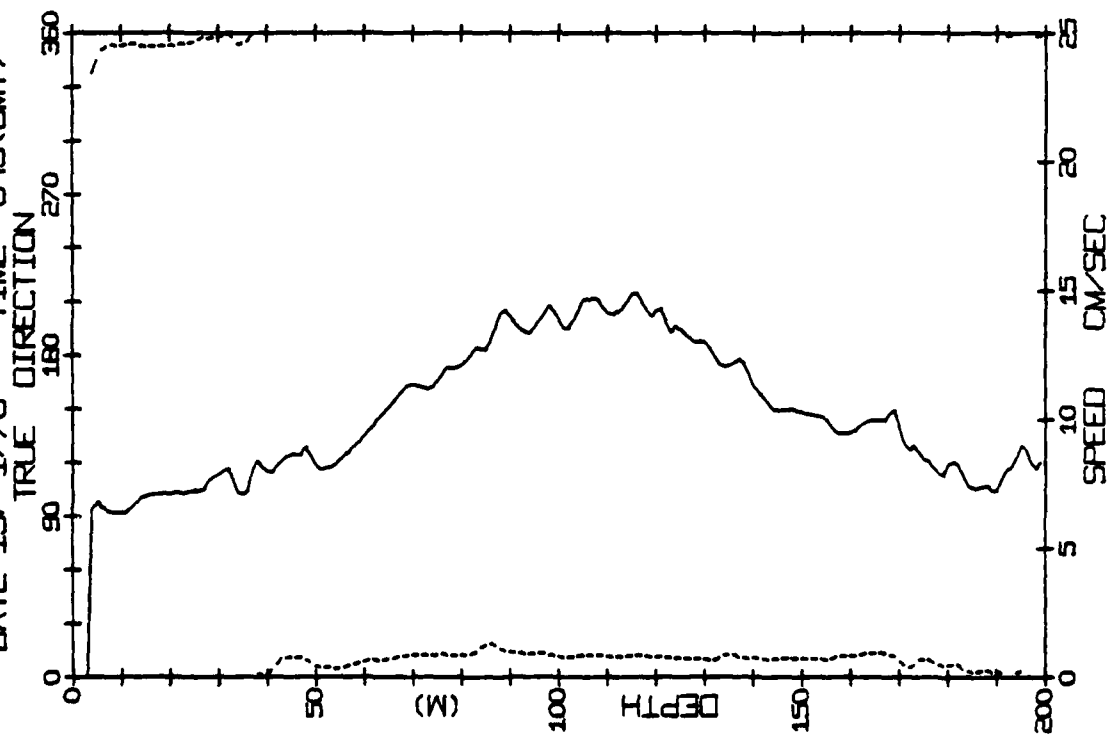
SNOWBIRD STATION 467 (194M.) 13/JAN/76 1957 GMT
 LAT= 73 9592N LONG= 145 0971W LTER= 1 LGER= 2
 NLEVEL= -0 1 ELEVEL= -2 2 NVER= 0 EVER= 0

[illegible][illegible][illegible][illegible][illegible][illegible]

CAMP SNOWBIRD STATION 470
DATE 15/ 1/76 TIME 1943(GMT)

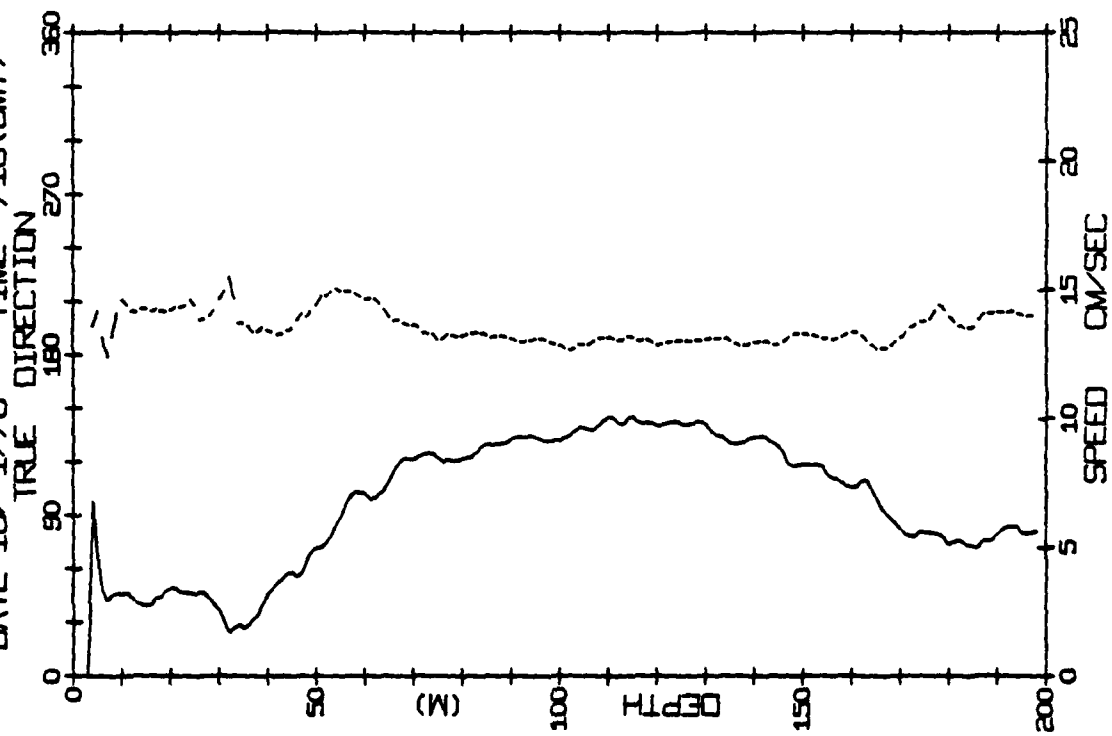


CAMP SNOWBIRD STATION 469
DATE 15/ 1/76 TIME 643(GMT)



CAMP SNOWBIRD
DATE 16/ 1/76

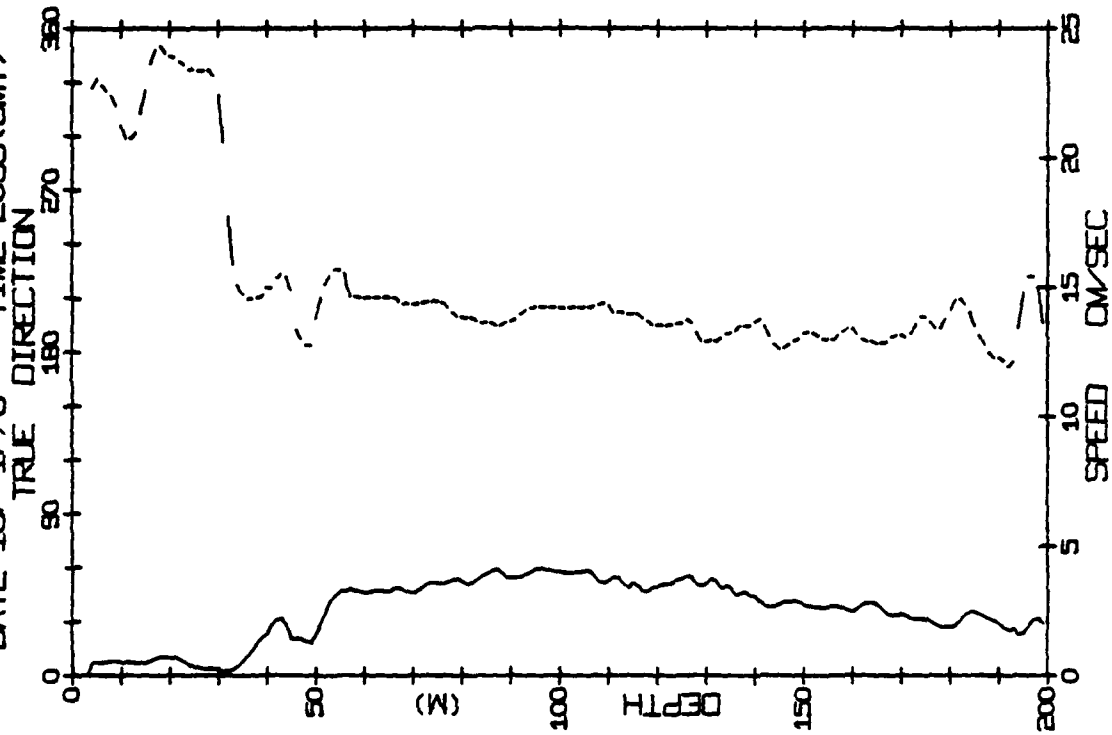
STATION 471
TIME 715 (GMT)

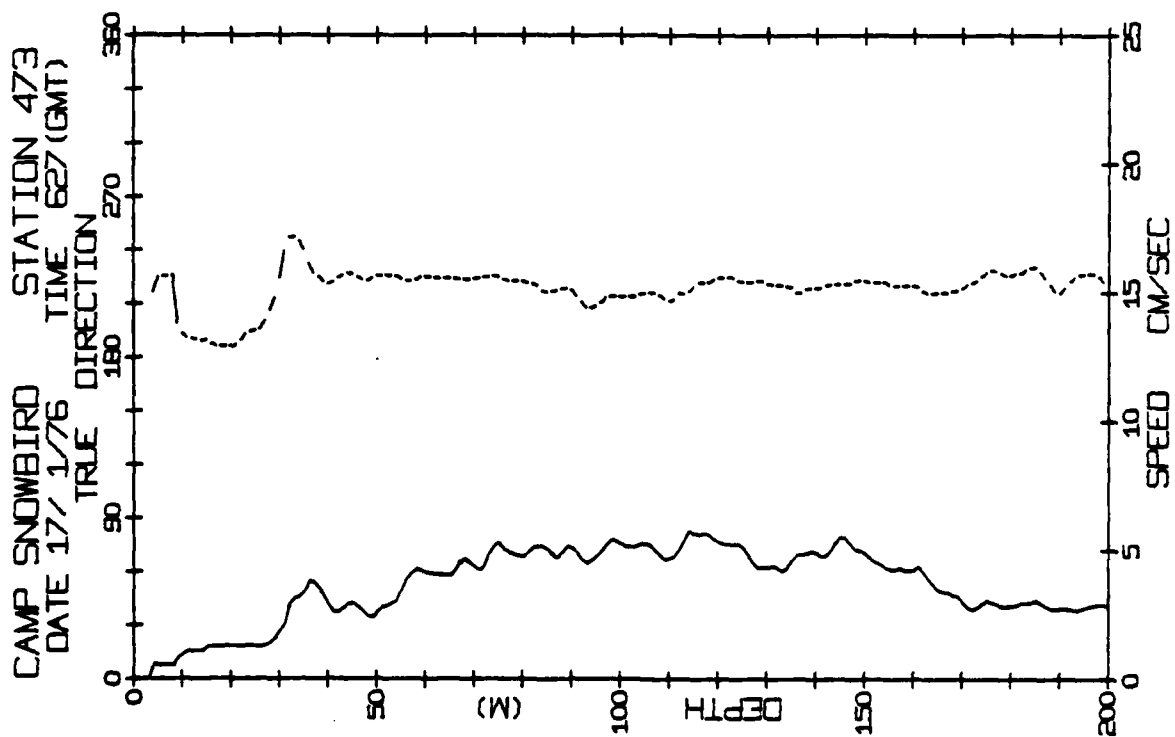
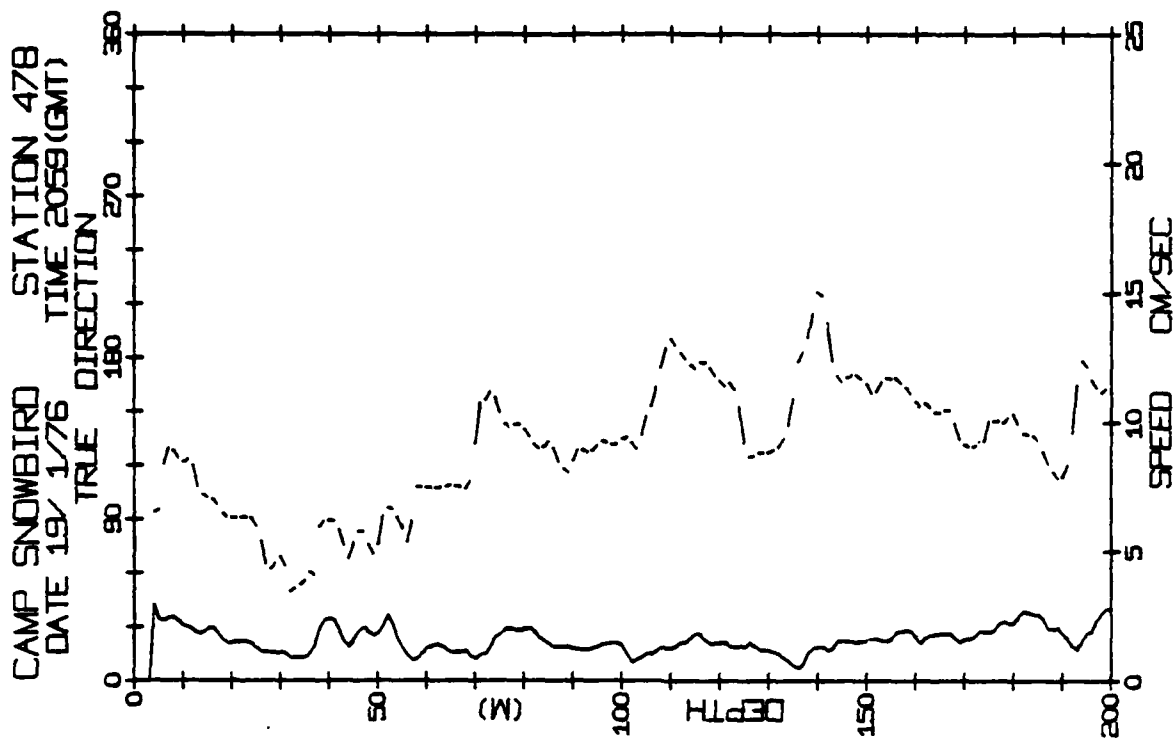


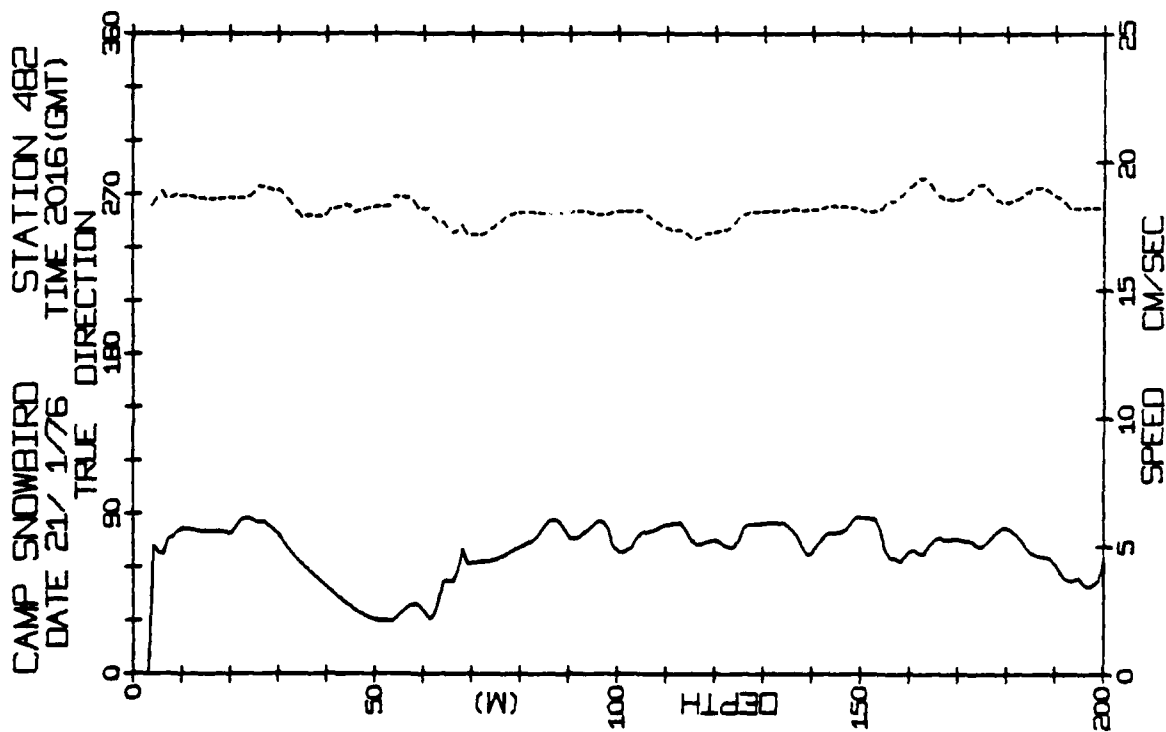
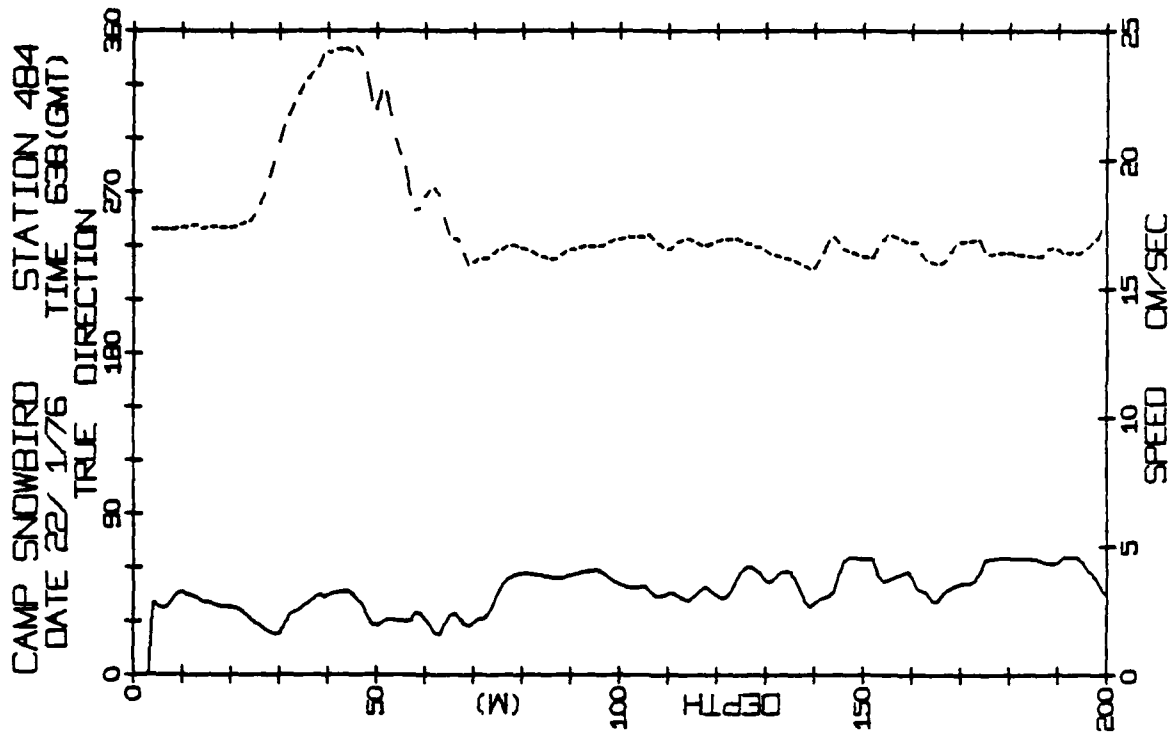
410

CAMP SNOWBIRD
DATE 16/ 1/76

STATION 472
TIME 2033 (GMT)





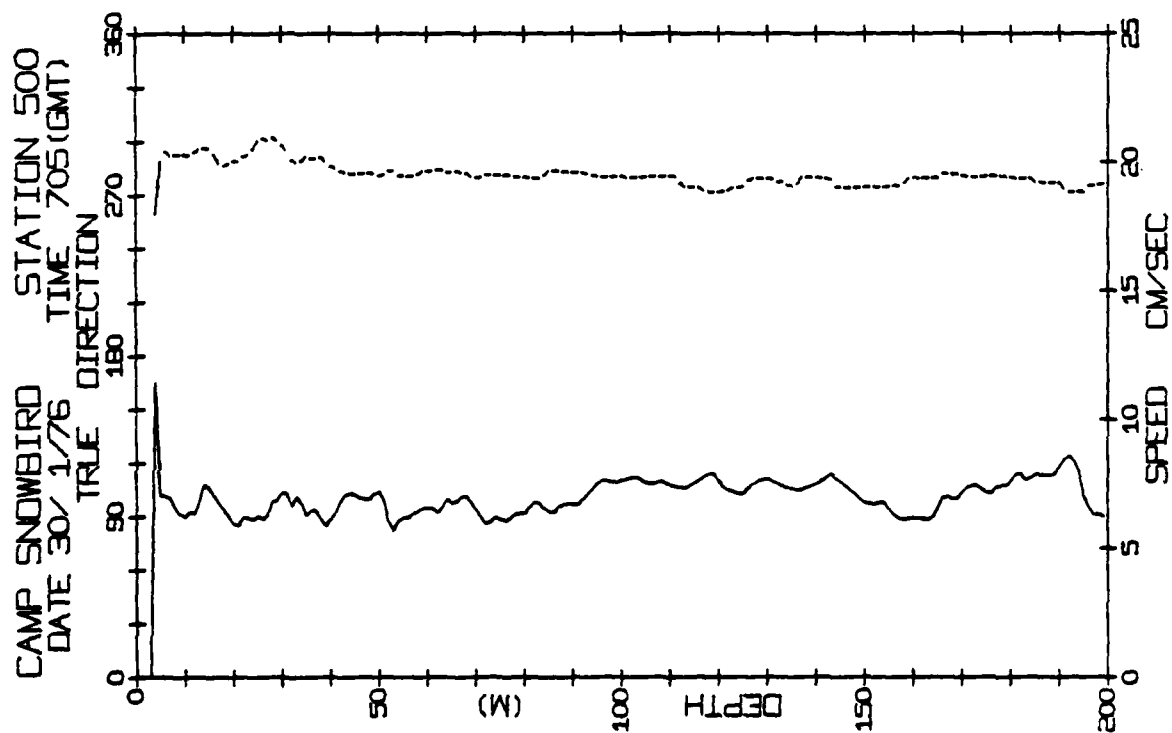
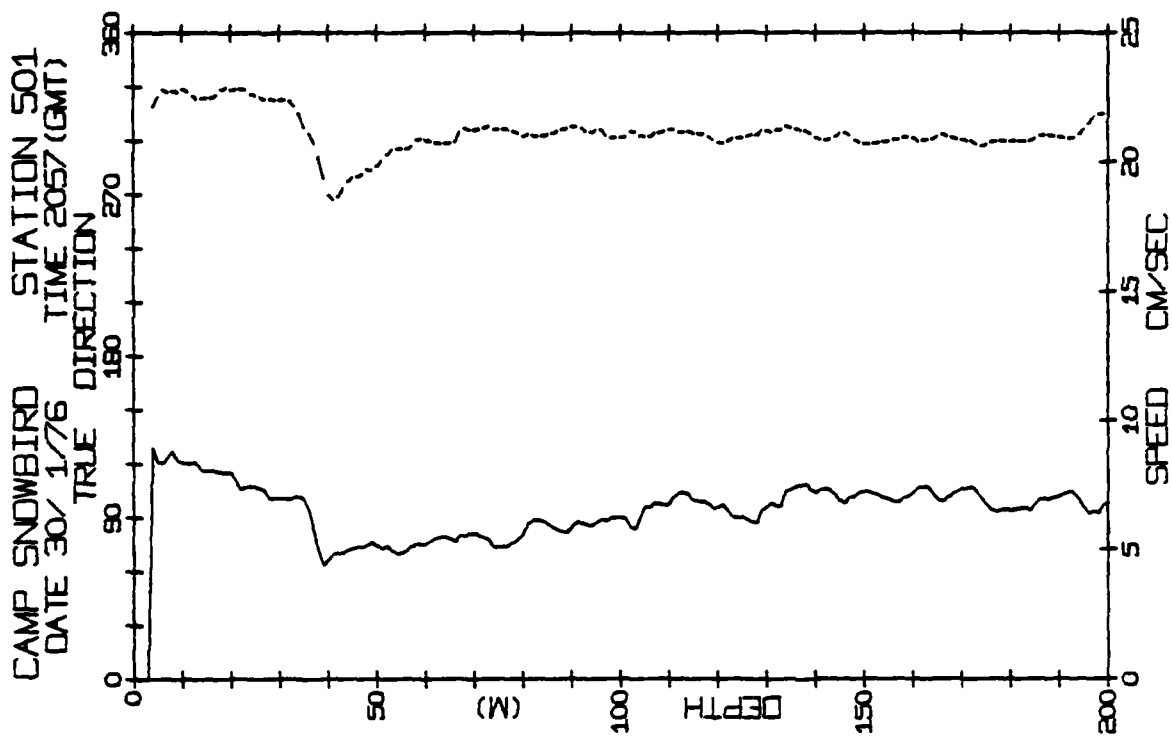


```

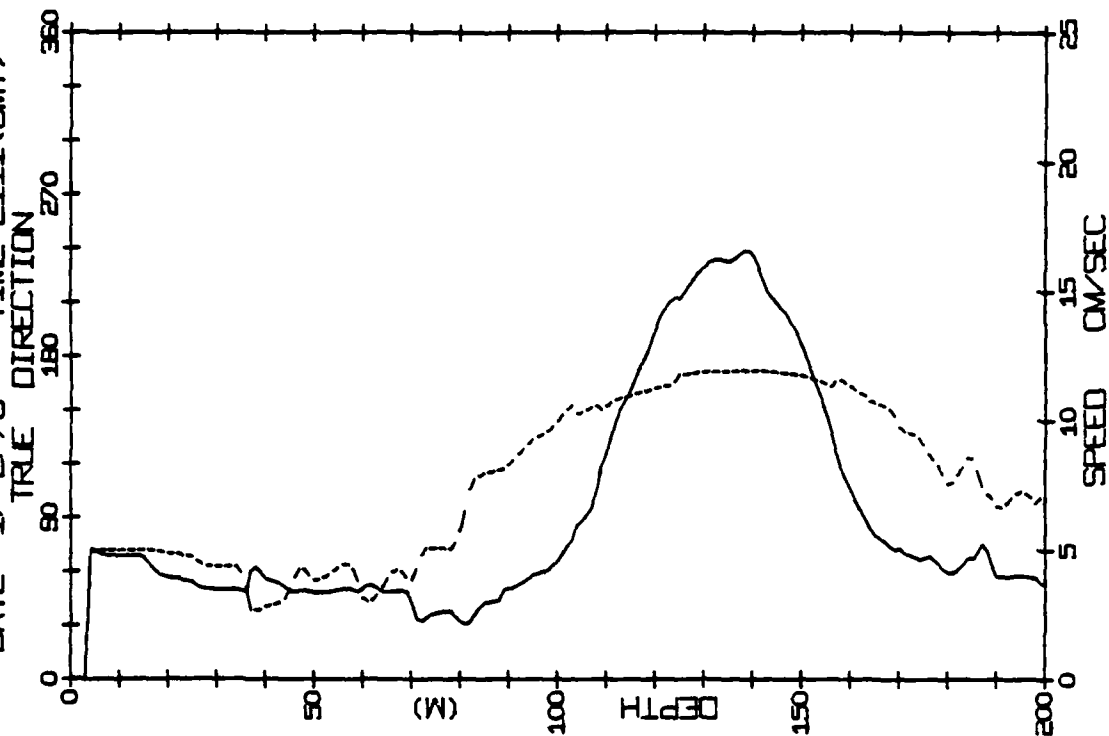
SNOWBIRD STATION 482      (200M )      21/JAN/76      2016 GMT
LAT= 73 9242N      LONG= 144 9469W      LTER= 1      LGER= 2
NIVEL= -1 B      EIVEL= -8.0      NVER= 0      EVER= 0

```

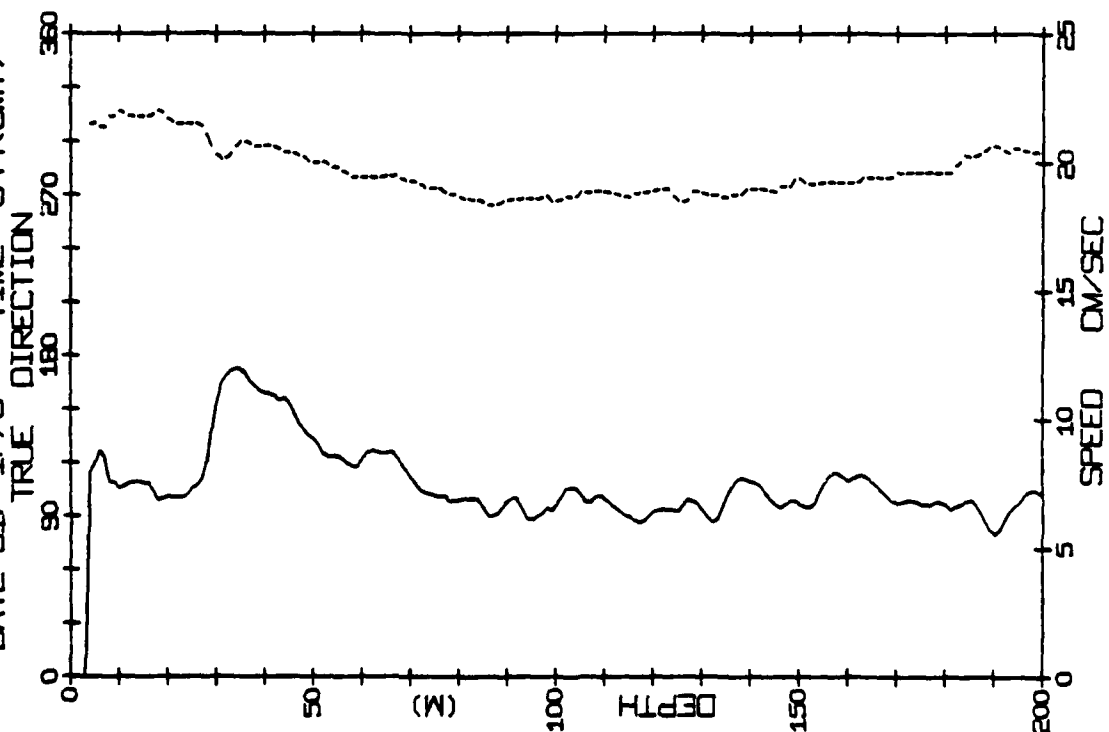
[illegible][illegible]



CAMP SNOWBIRD STATION 504
DATE 1/2/76 TIME 2111 (GMT)



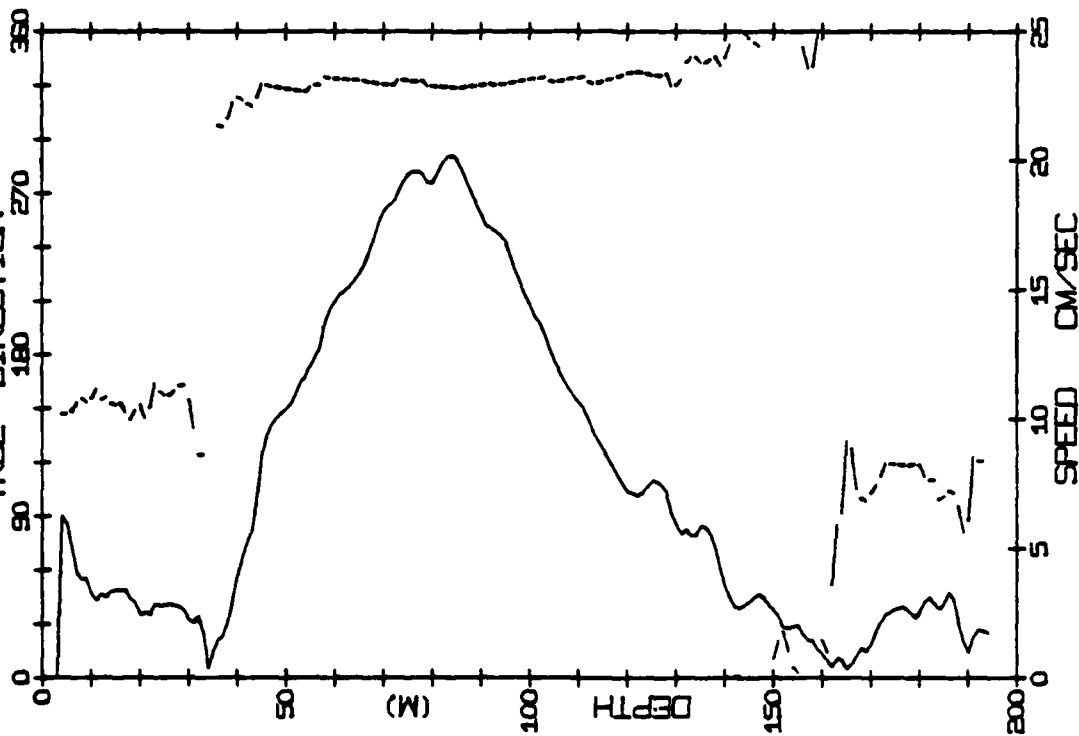
CAMP SNOWBIRD STATION 502
DATE 31/1/76 TIME 644 (GMT)



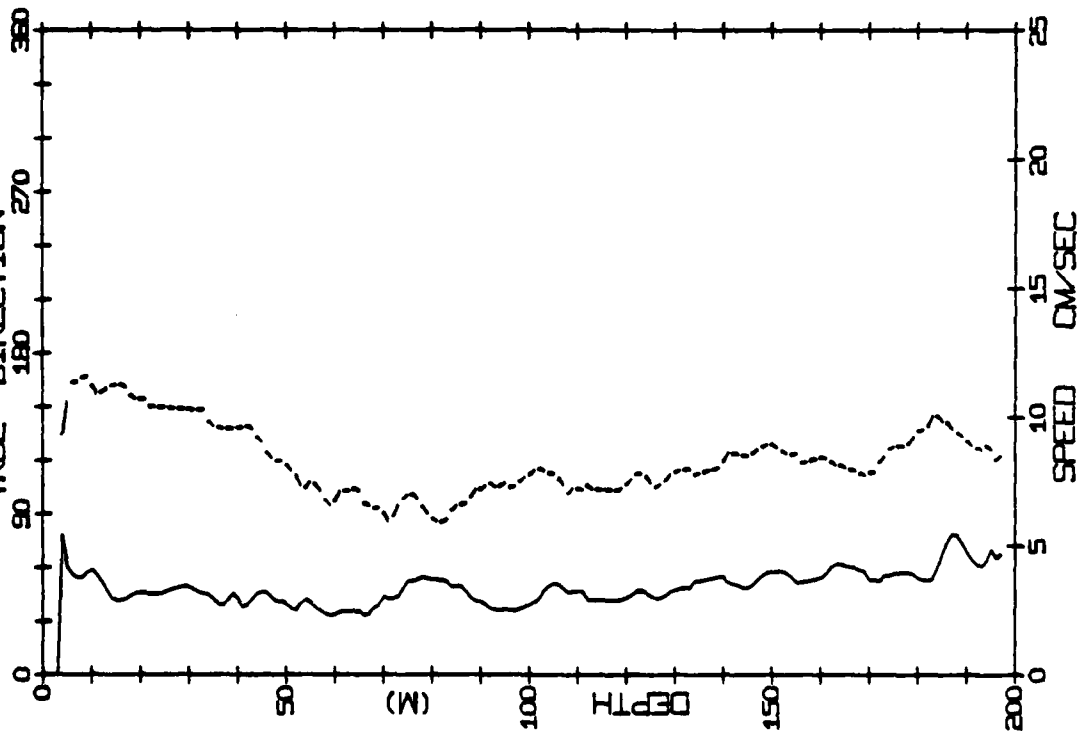
SNOWBIRD STATION 502 (200M.)
LAT= 73.8727N LONG= 145.6210W
NIVEL= 2.5 EIVEL= -14.0

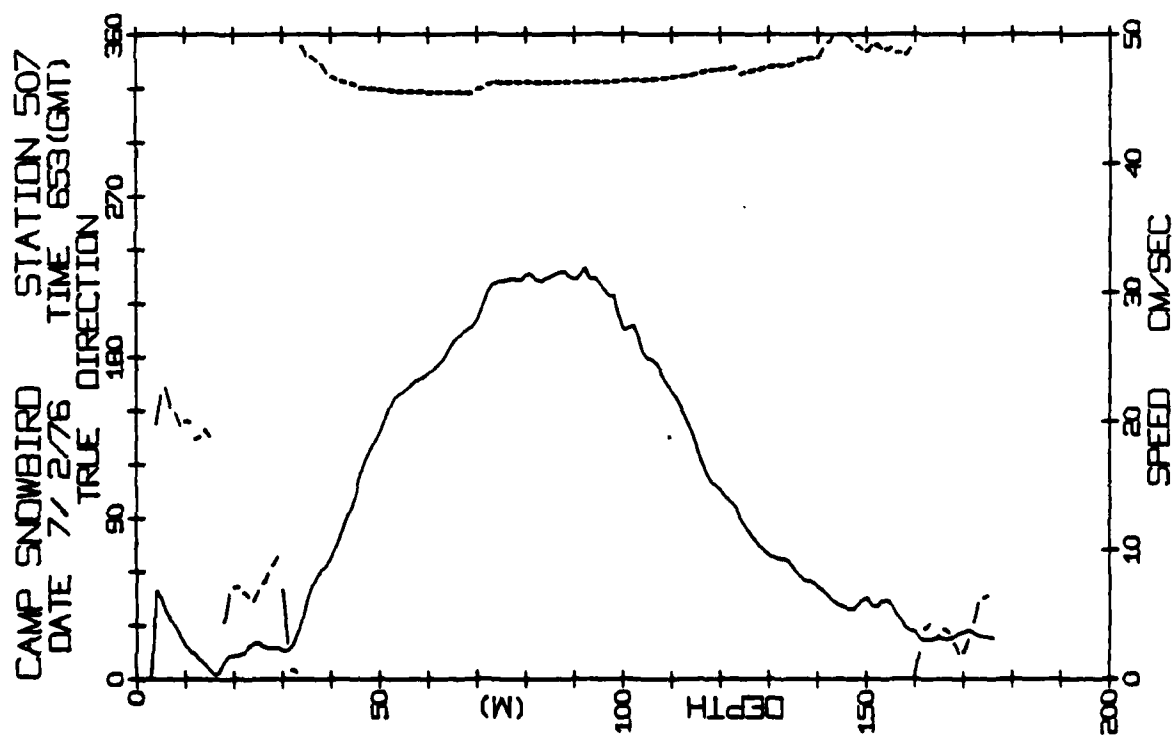
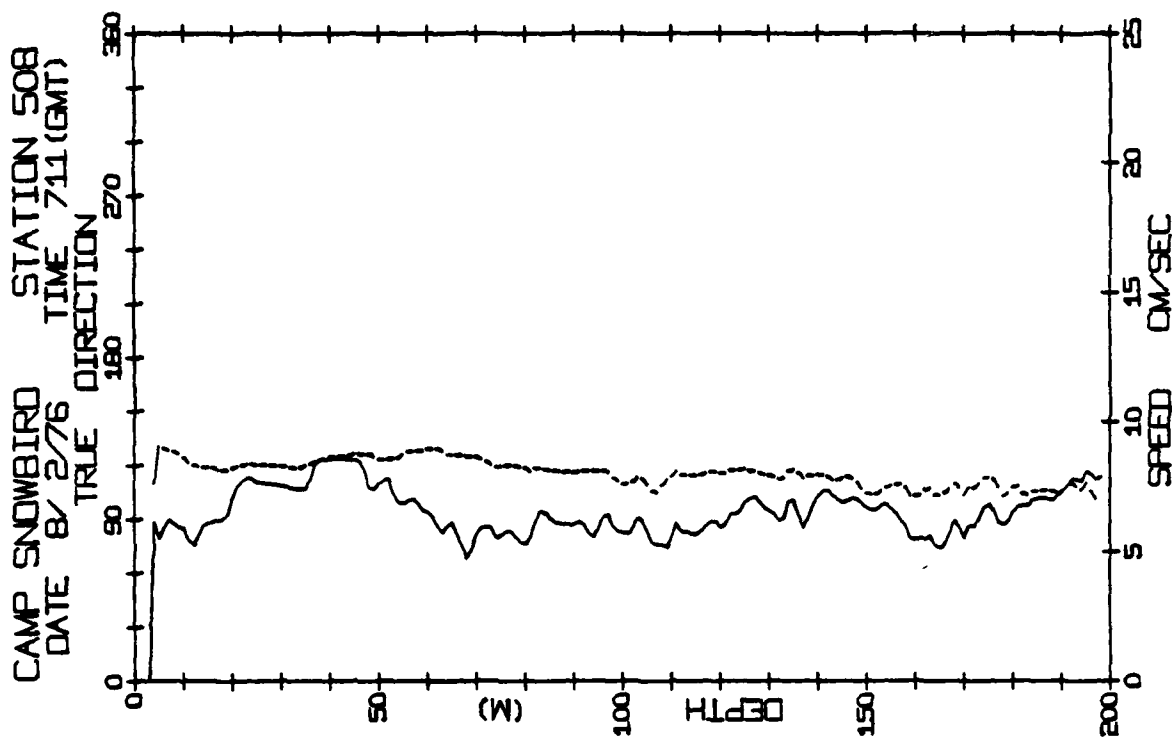
[illegible][illegible]

CAMP SNOWBIRD STATION 506
 DATE 7/2/76 TIME 42(GMT)
 TRUE DIRECTION



CAMP SNOWBIRD STATION 505
 DATE 8/2/76 TIME 805(GMT)
 TRUE DIRECTION

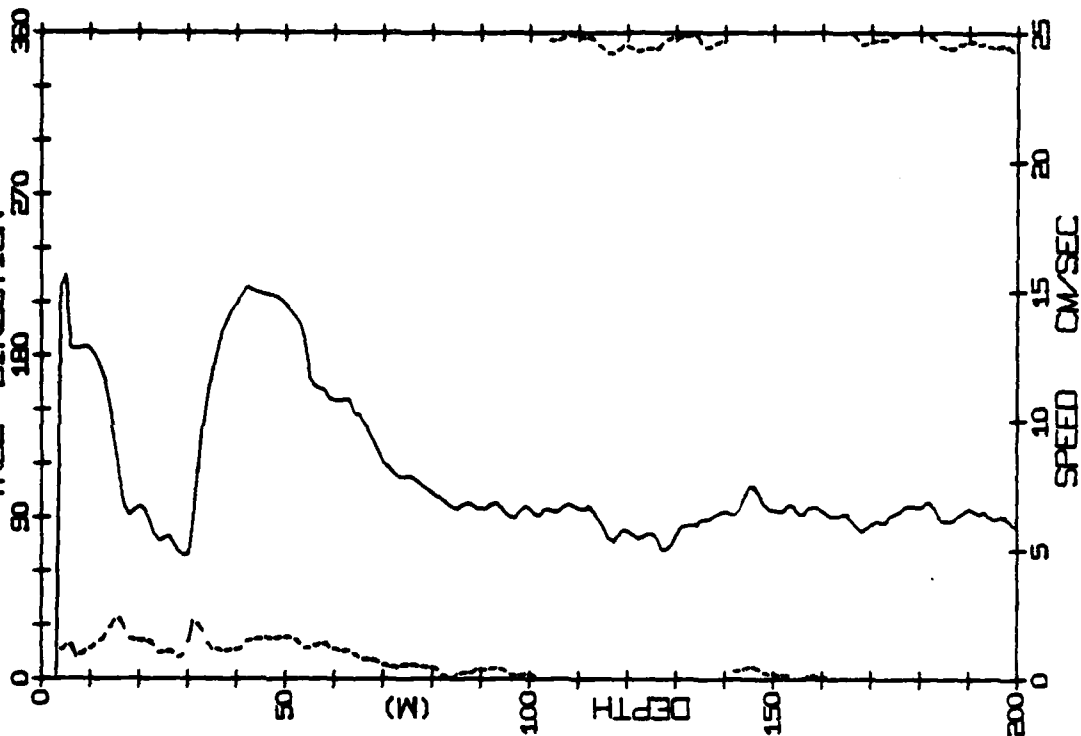




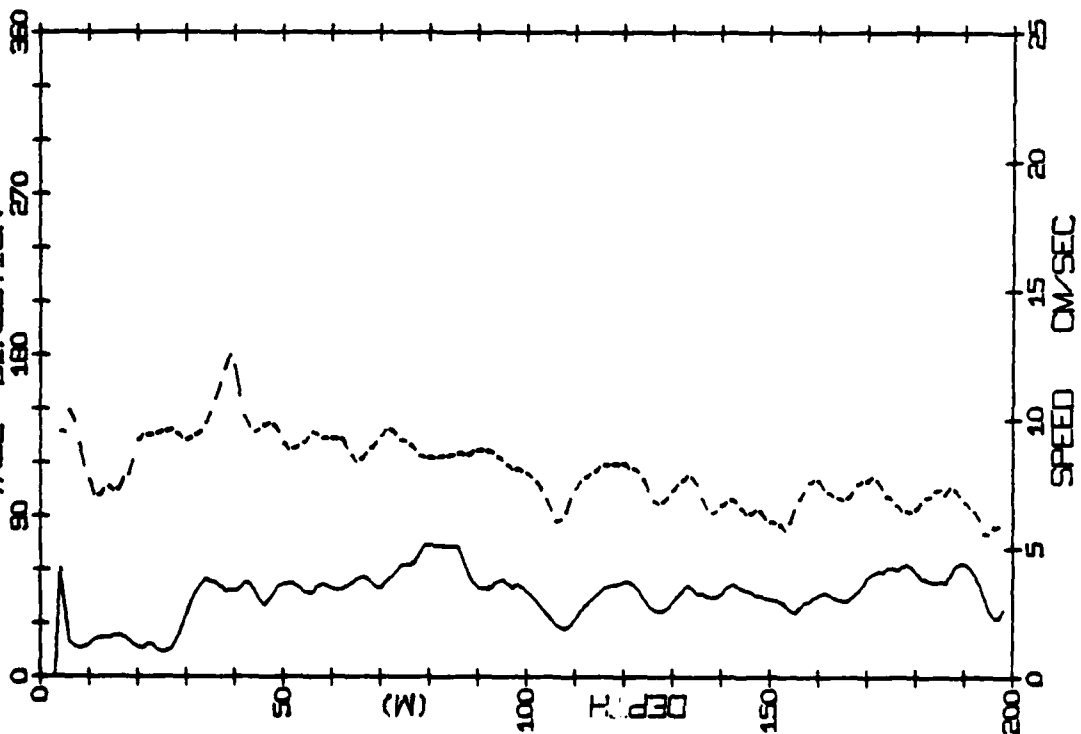
SNOWBIRD STATION 508 (1981.) 8/FEB/76 711 GMT
LAT= 73.7673N LONG= 145.0271W LTER= 7. LOER= 21.
HVEL= -6.1 EVEL= 8.4 NVER= 0. EVER= 1.

[illegible]

CAMP SNOWBIRD STATION 541
 DATE 27/2/76 TIME 652(GMT)
 TRUE DIRECTION

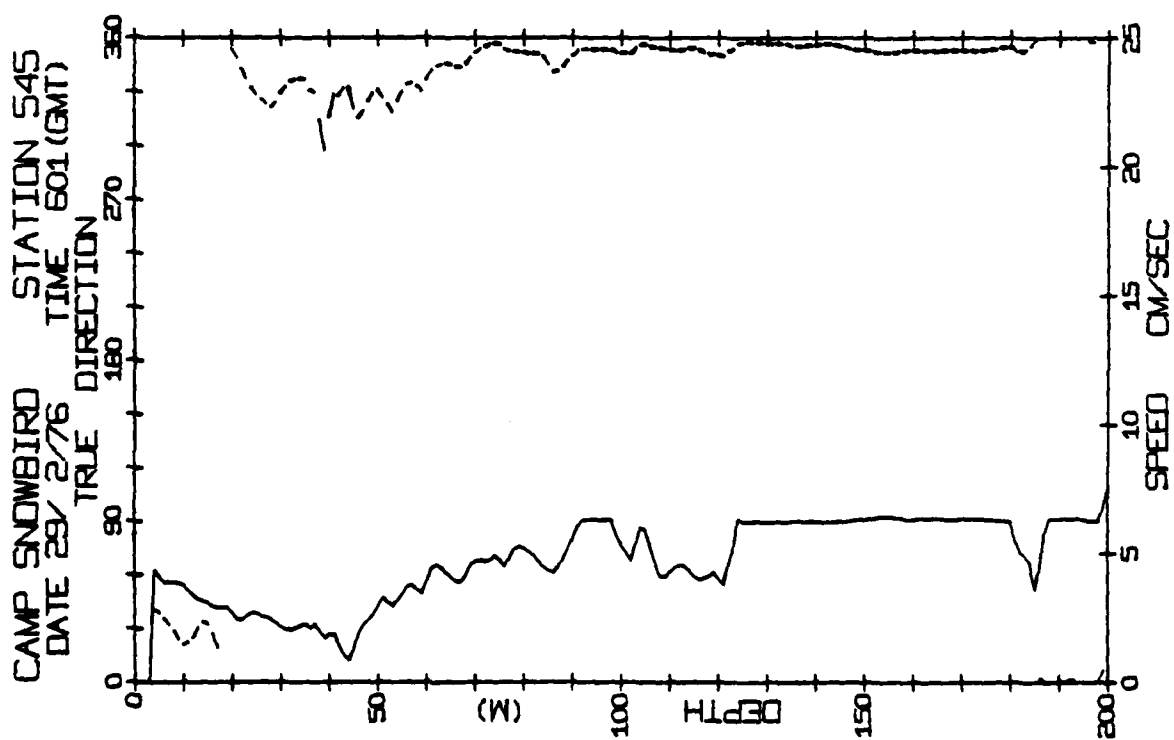
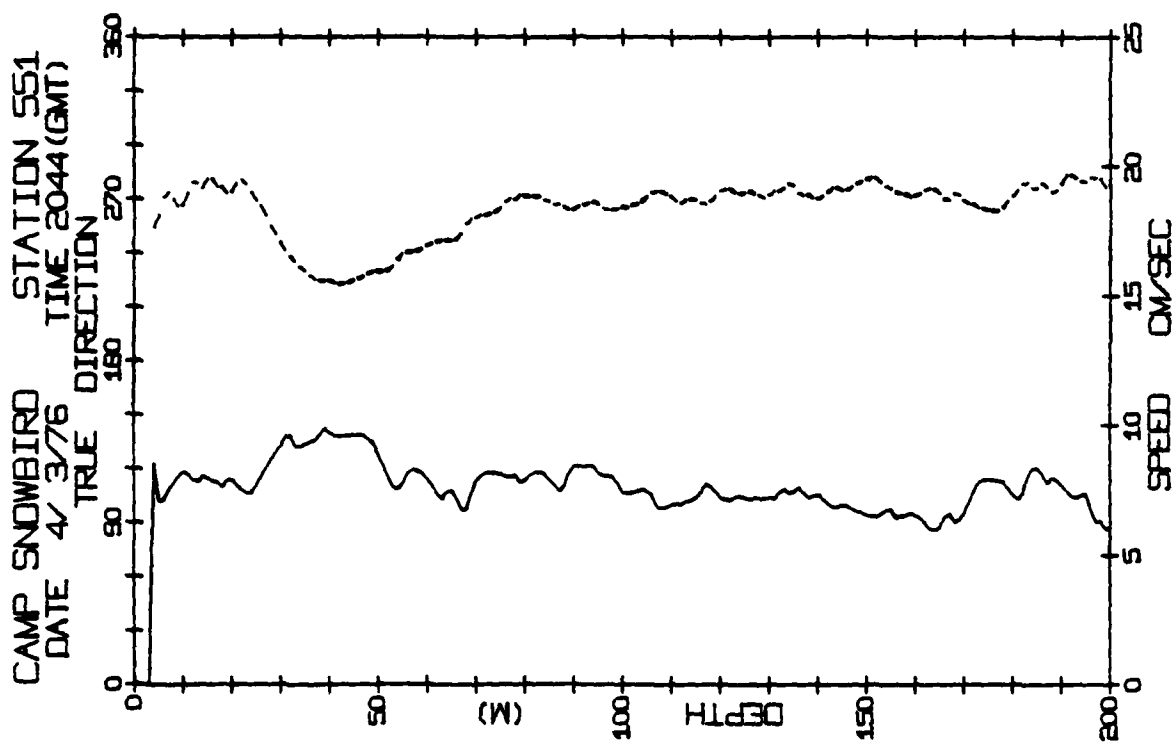


CAMP SNOWBIRD STATION 509
 DATE 9/2/76 TIME 728(GMT)
 TRUE DIRECTION

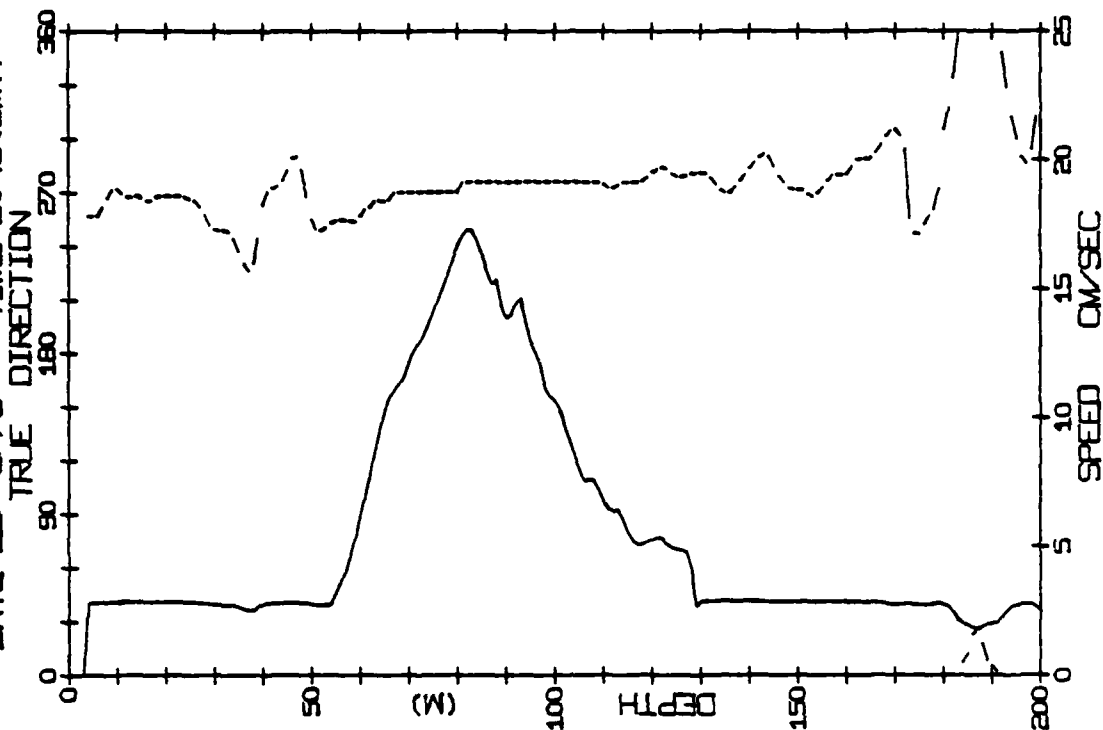


SNOWBIRD STATION 509 (198M.) 9/FEB/76 728 GMT
LAT= 73 72.38N LONG= 144.8531W LTER= 1. LGER= 2
NIVEL= -4 3 EIVEL= 5 3 NVER= 0. EVER= 0.

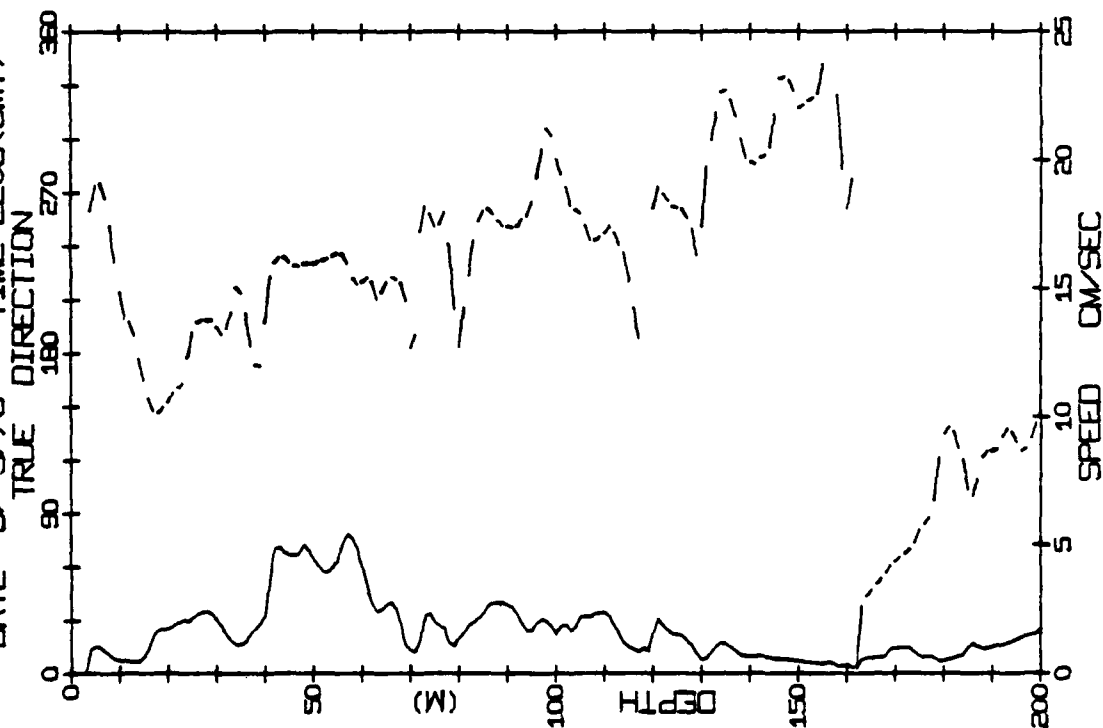
[illegible][illegible]

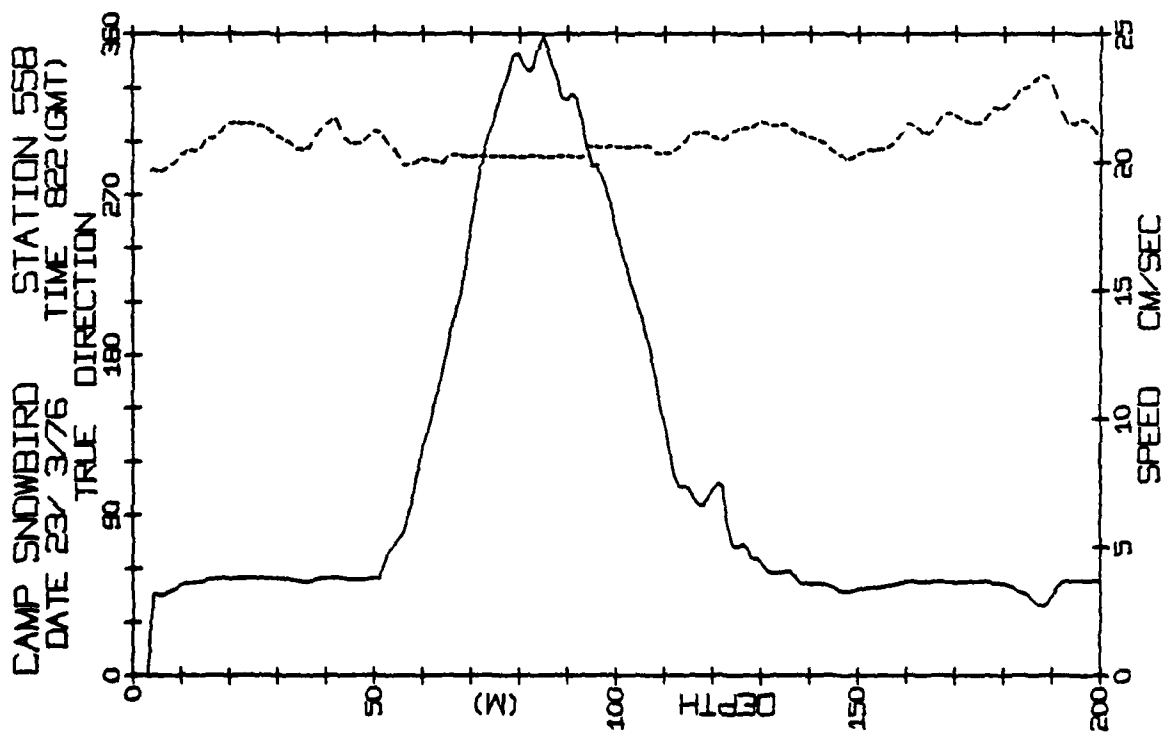
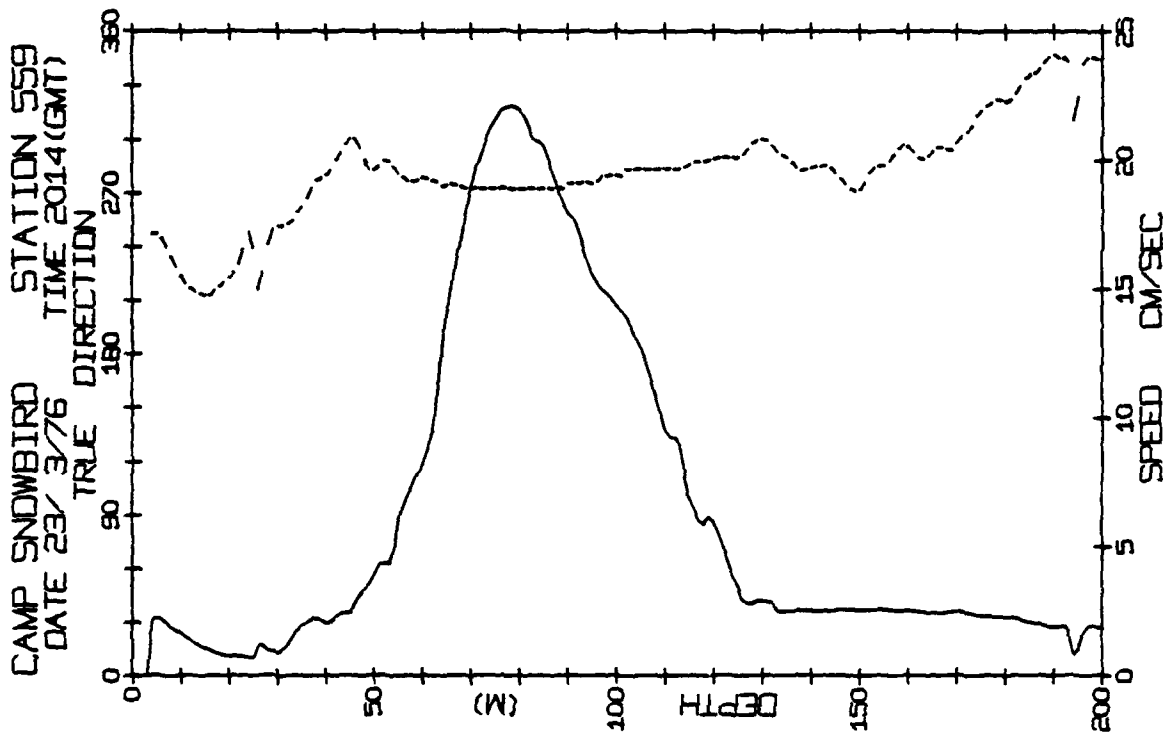


CAMP SNOWBIRD STATION 557
DATE 22/ 3/76 TIME 2043(GMT)

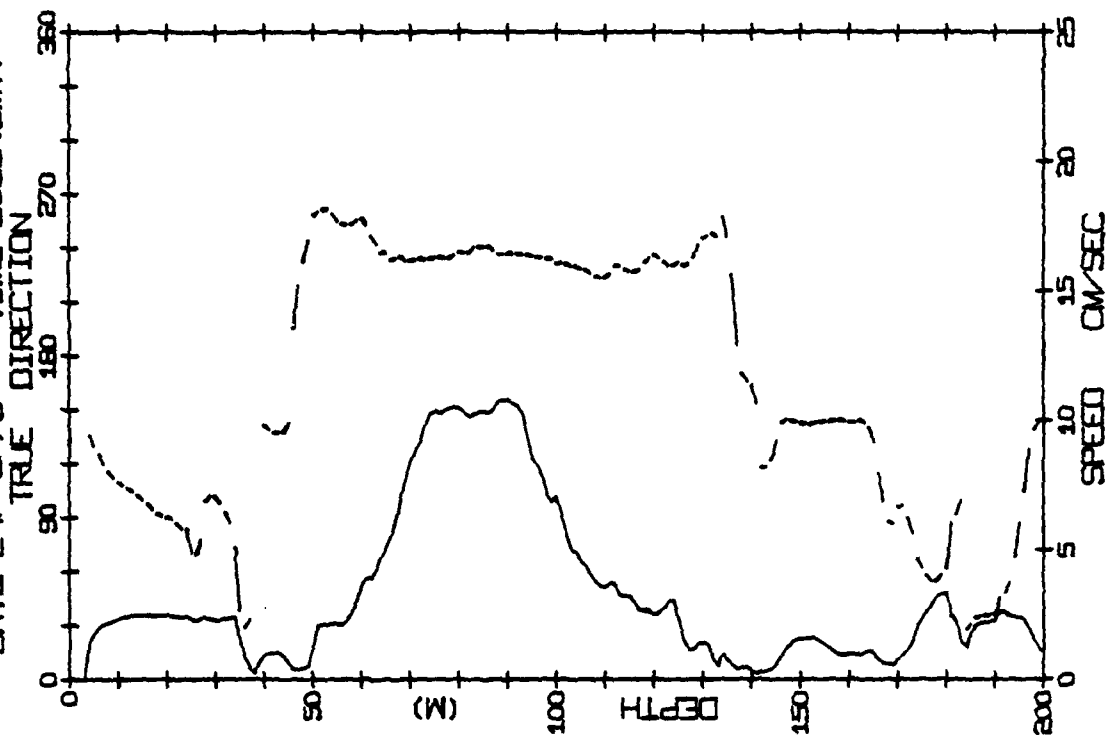


CAMP SNOWBIRD STATION 552
DATE 5/ 3/76 TIME 2208(GMT)

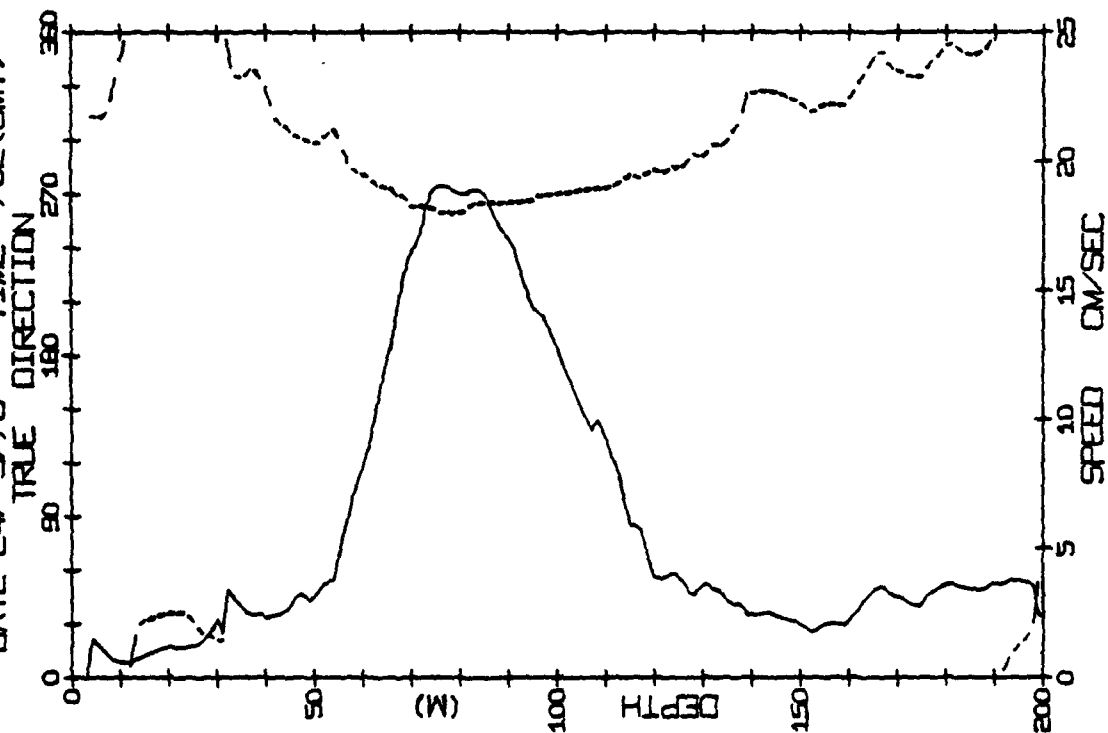


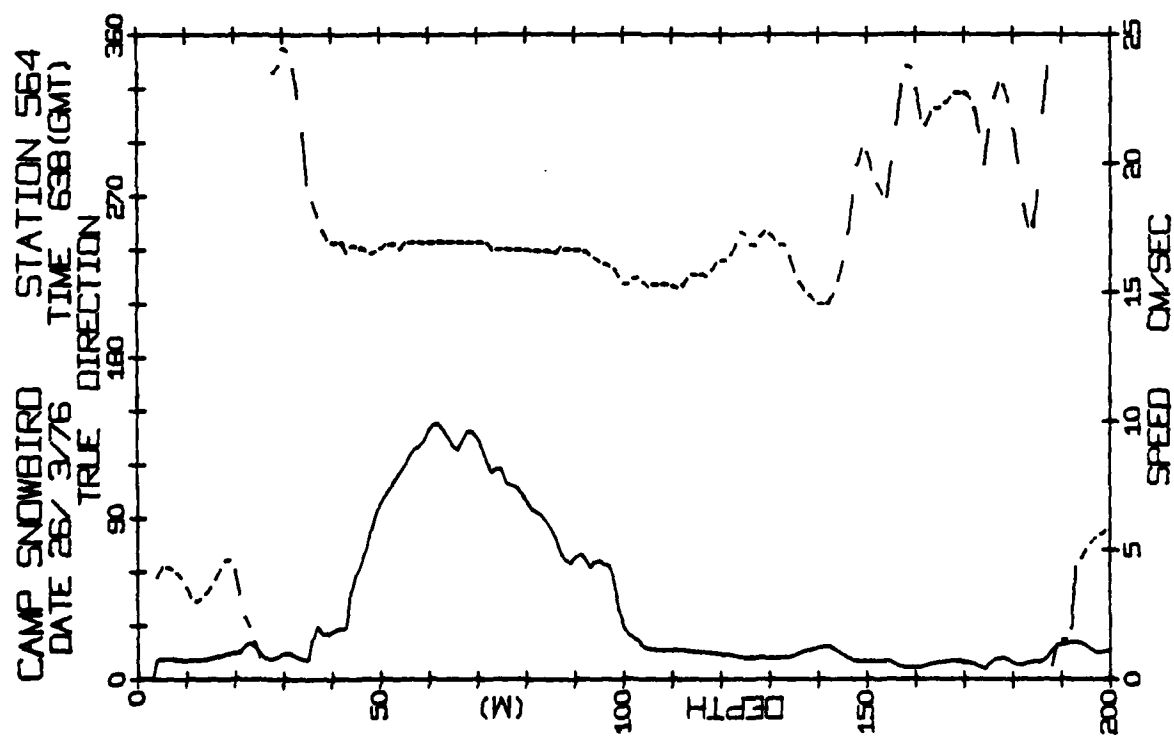
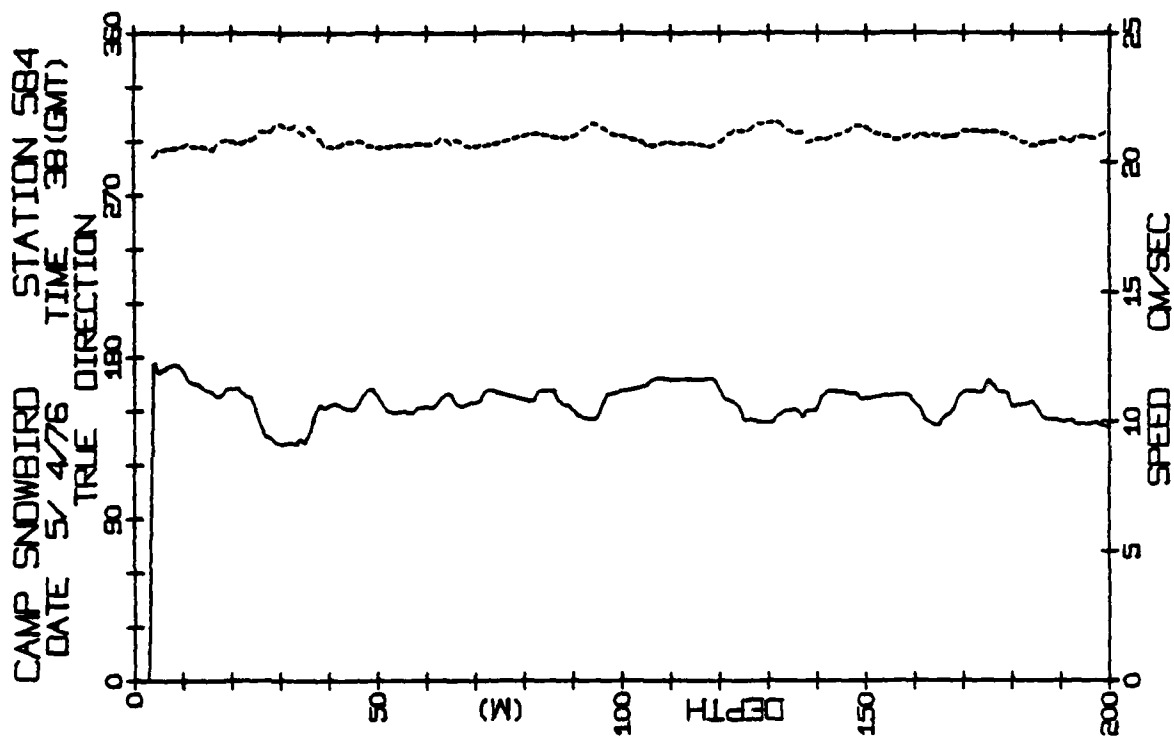


CAMP SNOWBIRD STATION 561
DATE 24/ 3/76 TIME 2011 (GMT)



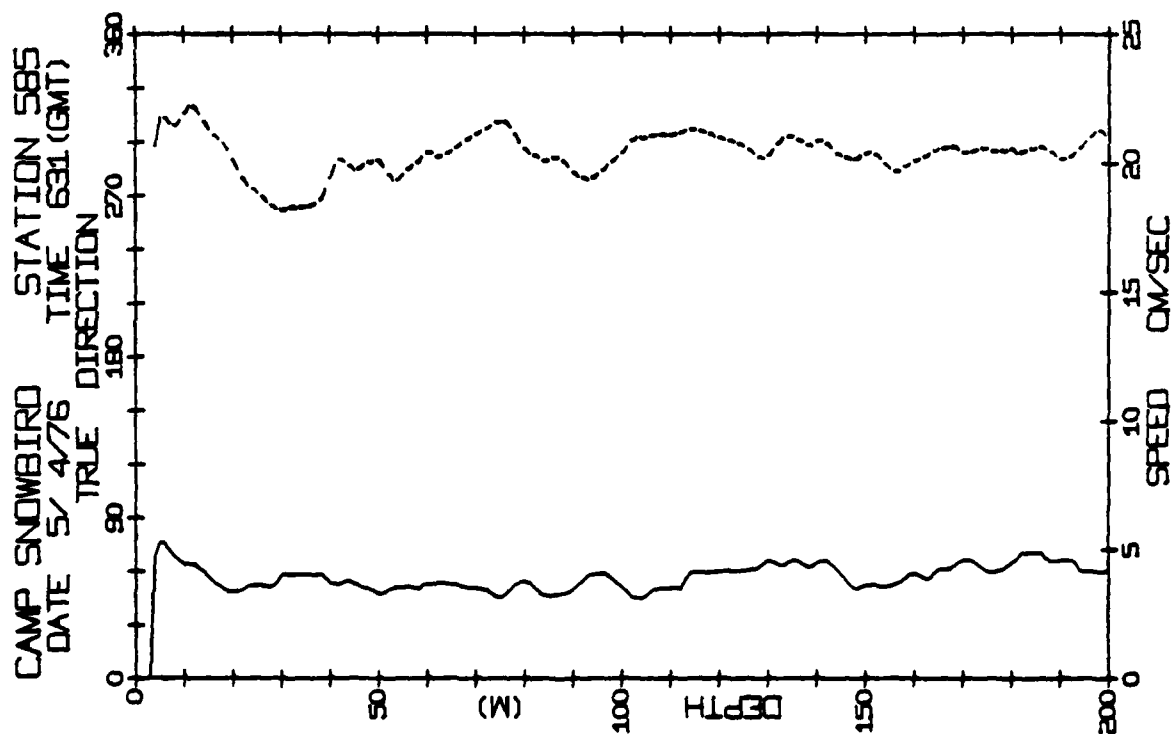
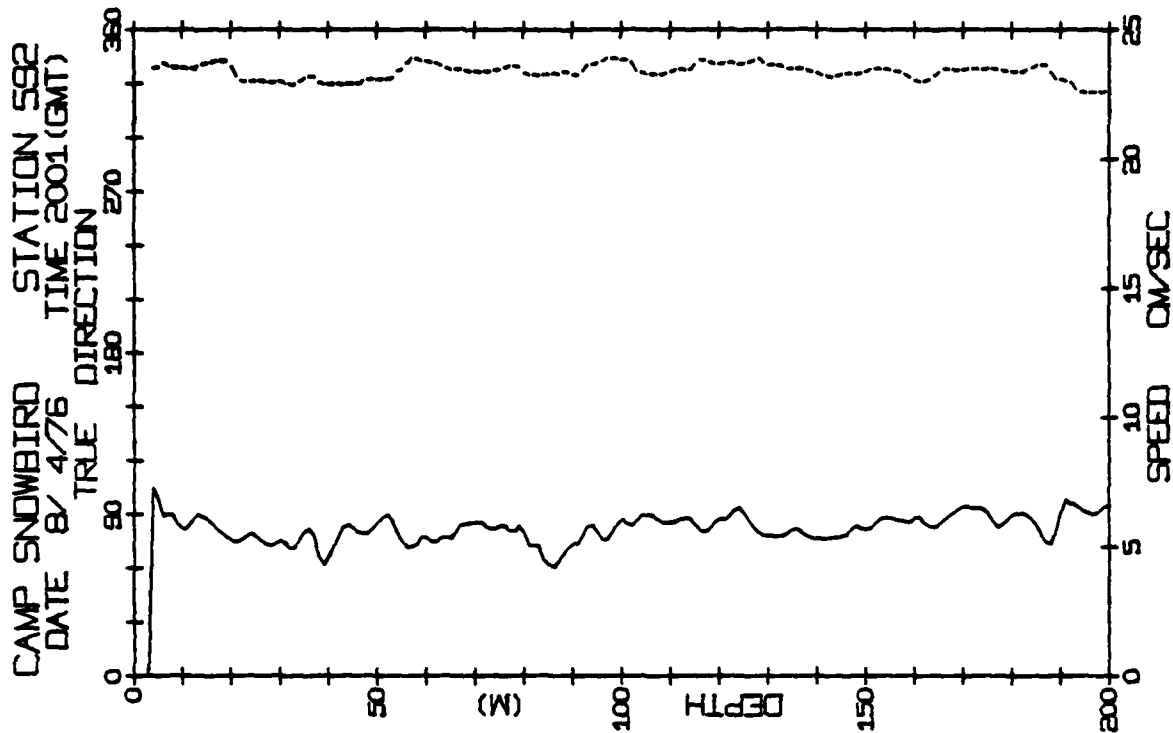
CAMP SNOWBIRD STATION 560
DATE 24/ 3/76 TIME 702 (GMT)

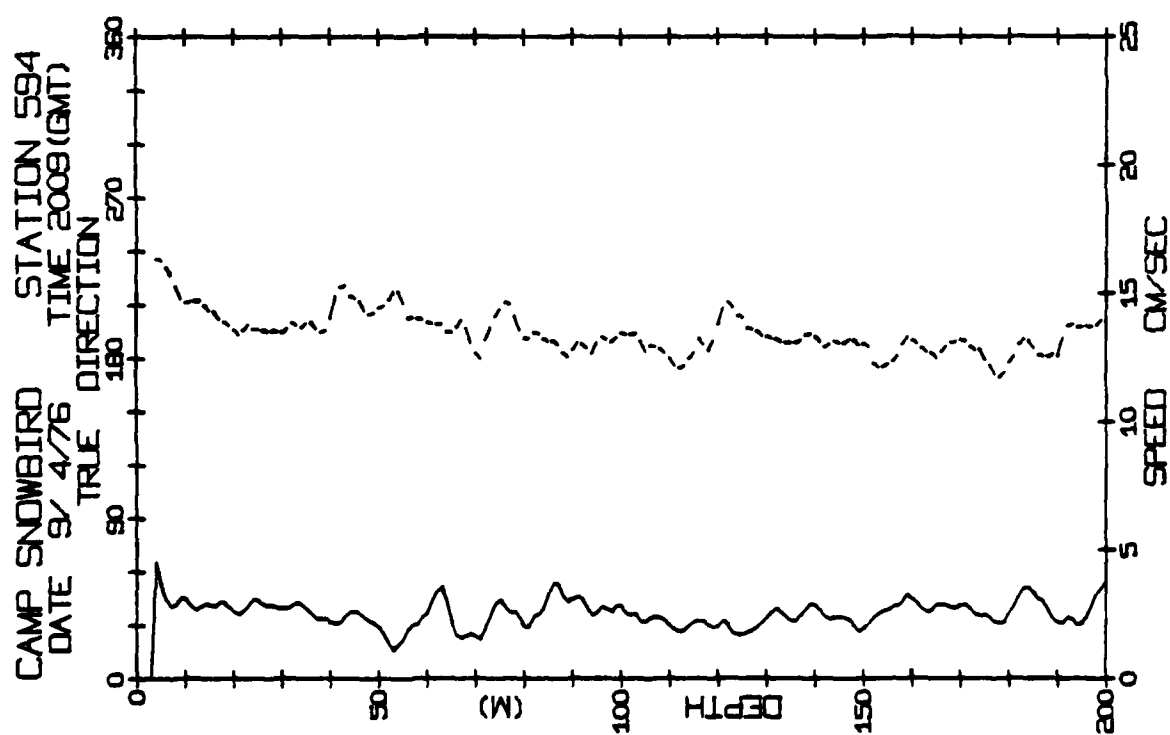
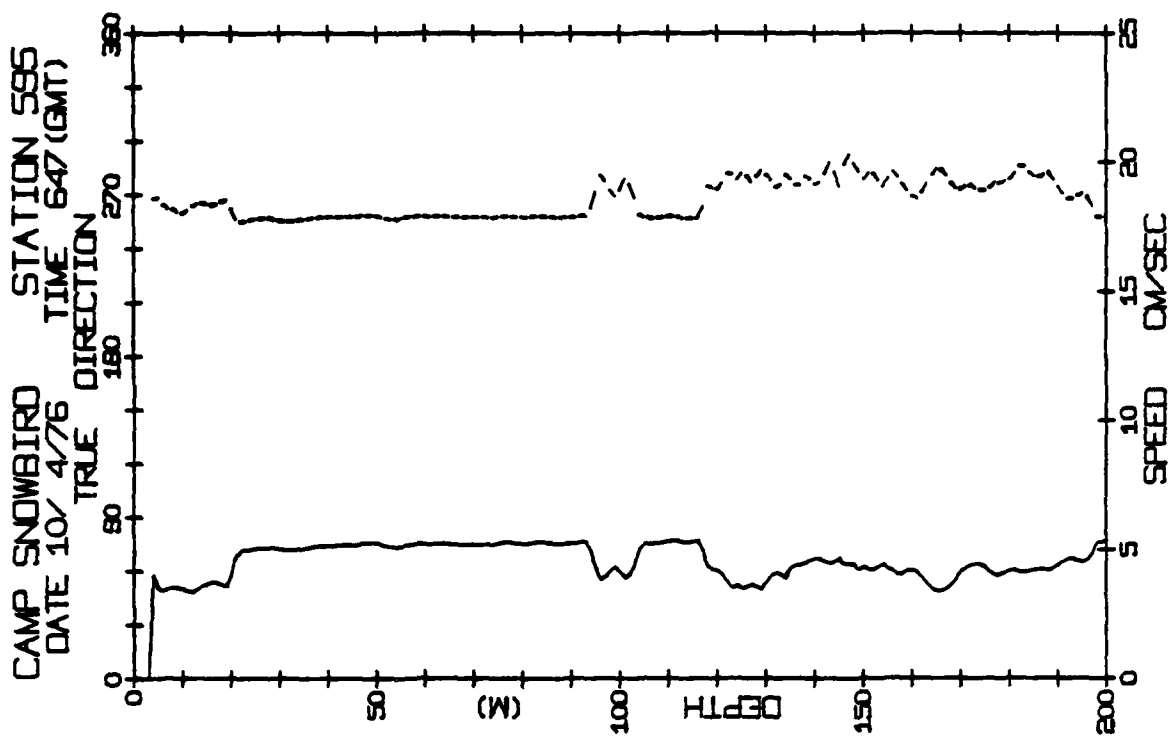




SNOWBIRD STATION 564 (200M.) 26/MAR/76 638 GMT
LAT= 73.3682N LONG= 145.3836W LTER= 1 LOER= 2
ELEV= -0.4 EVEL= 1.0 NVER= 0 EVER= 0

[illegible]

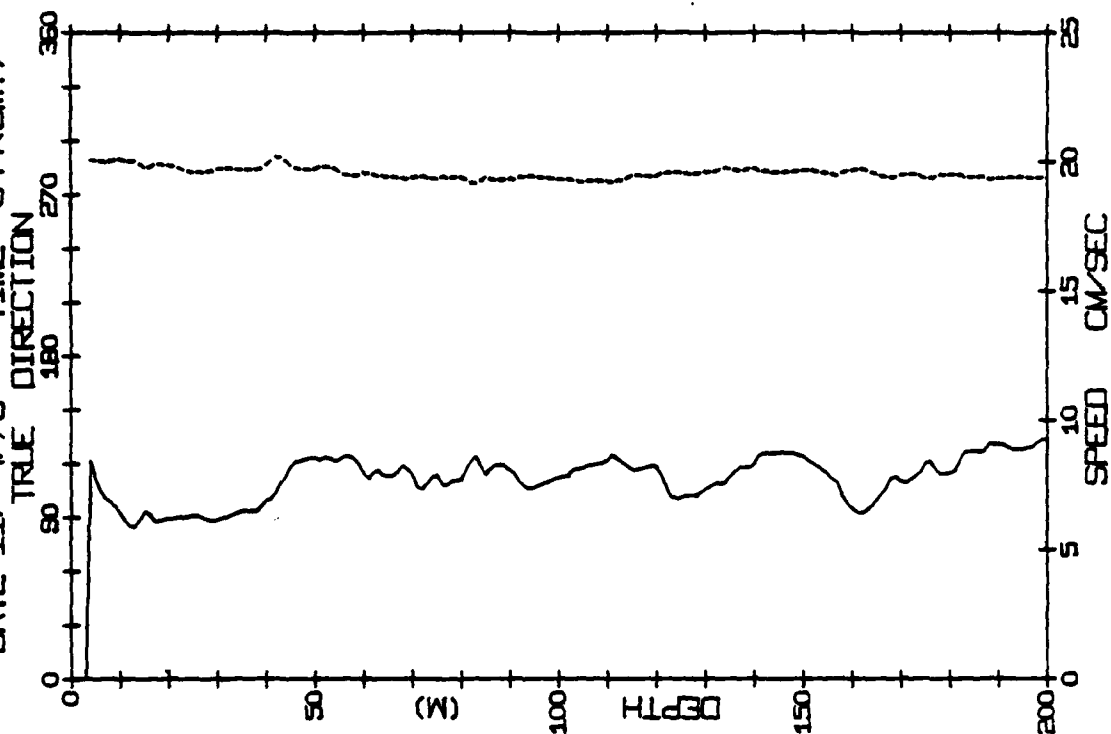




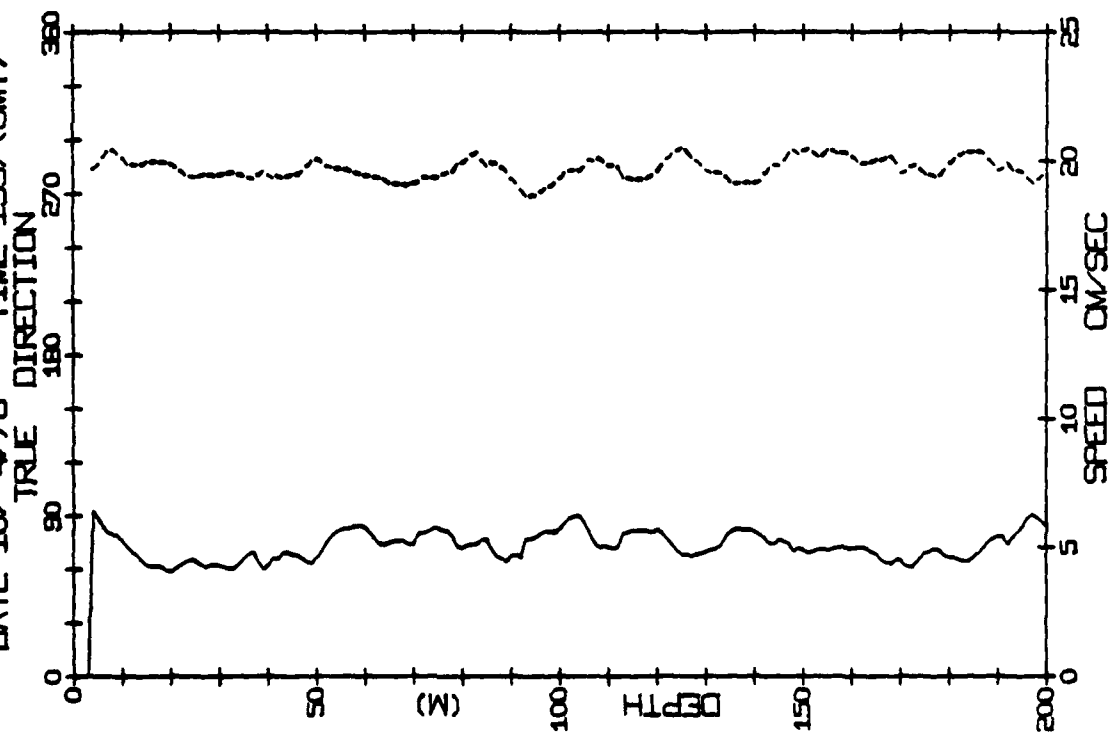
SNOWBIRD STATION 594 (200M.) 9/APR/76 2009 GMT
LAT= 73.4093N LONG= 145.6681W LTER= 5 LGER= 6
ELEVEL= -6.6 EVEL= -3.4 NVER= 0 EVER= 1

[illegible][illegible]

CAMP SNOWBIRD STATION 597
DATE 11/ 4/76 TIME 644(GMT)



CAMP SNOWBIRD STATION 596
DATE 10/ 4/76 TIME 1937(GMT)



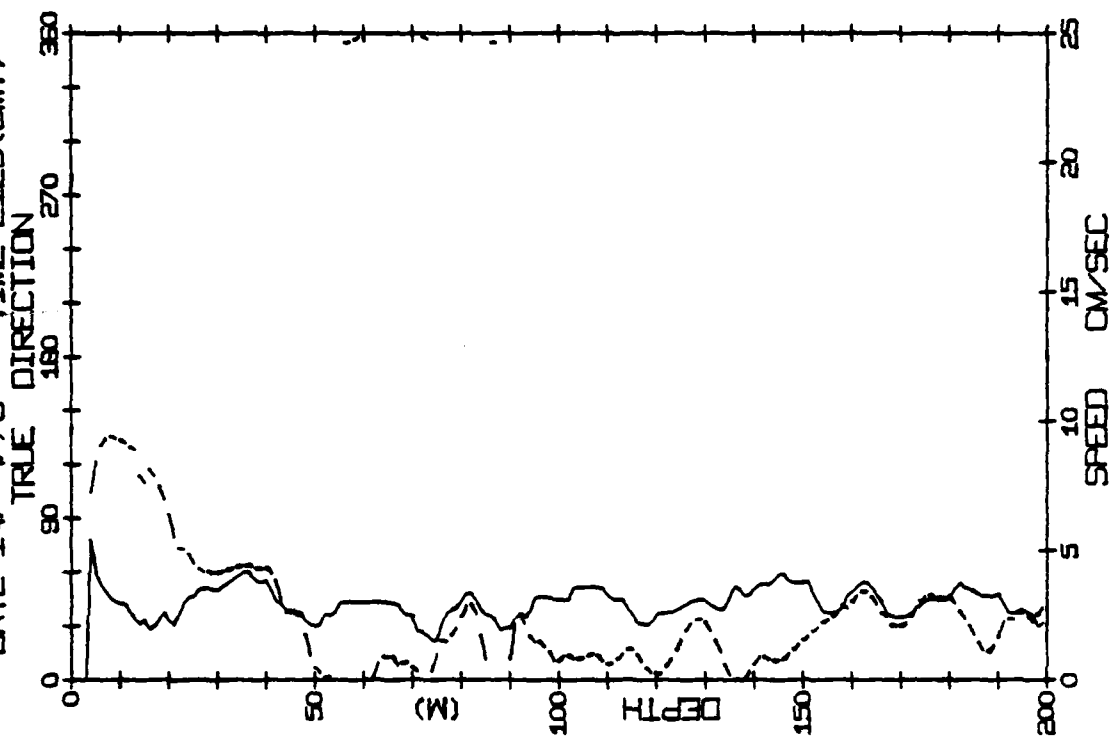
```

SNOWBIRD STATION 596 (200M) 10/APR/76 1937 GMT
LAT= 73.3789N LONG= 145.8122W LTER= 0 LGER= 0
NIVEL= -1.5 EVEL= -8.8 NVER= 0 EVER= 0

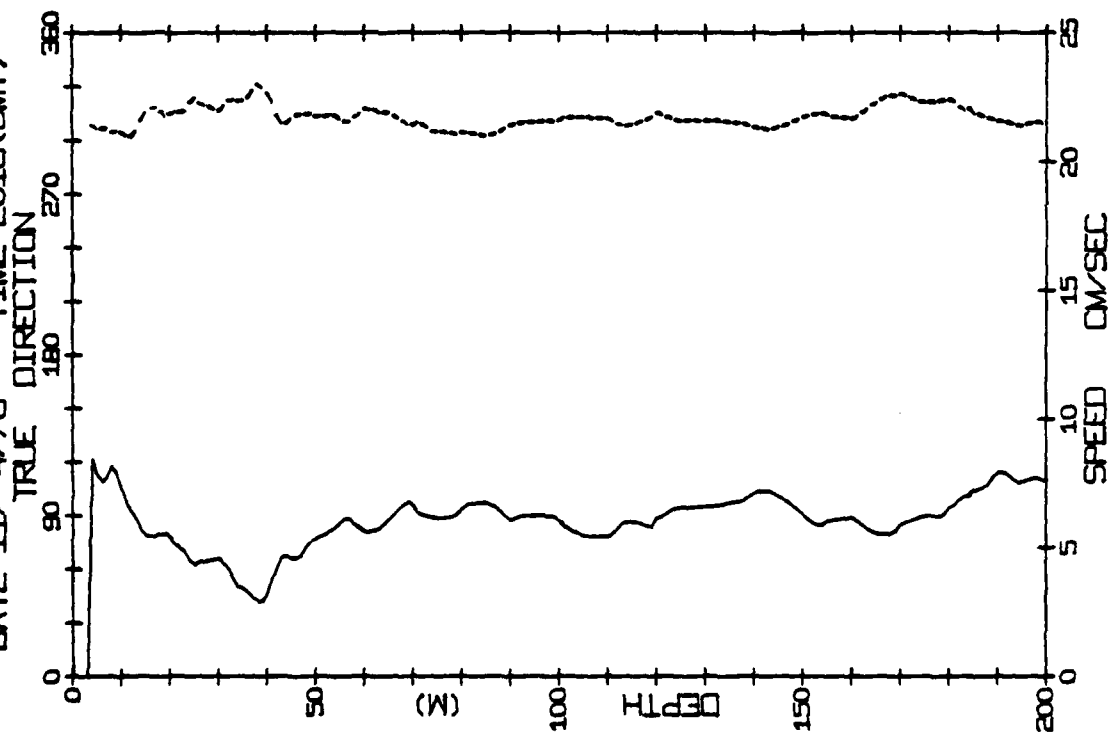
```

[illegible][illegible]

CAMP SNOWBIRD STATION 605
DATE 14/ 4/76 TIME 2129(GMT)



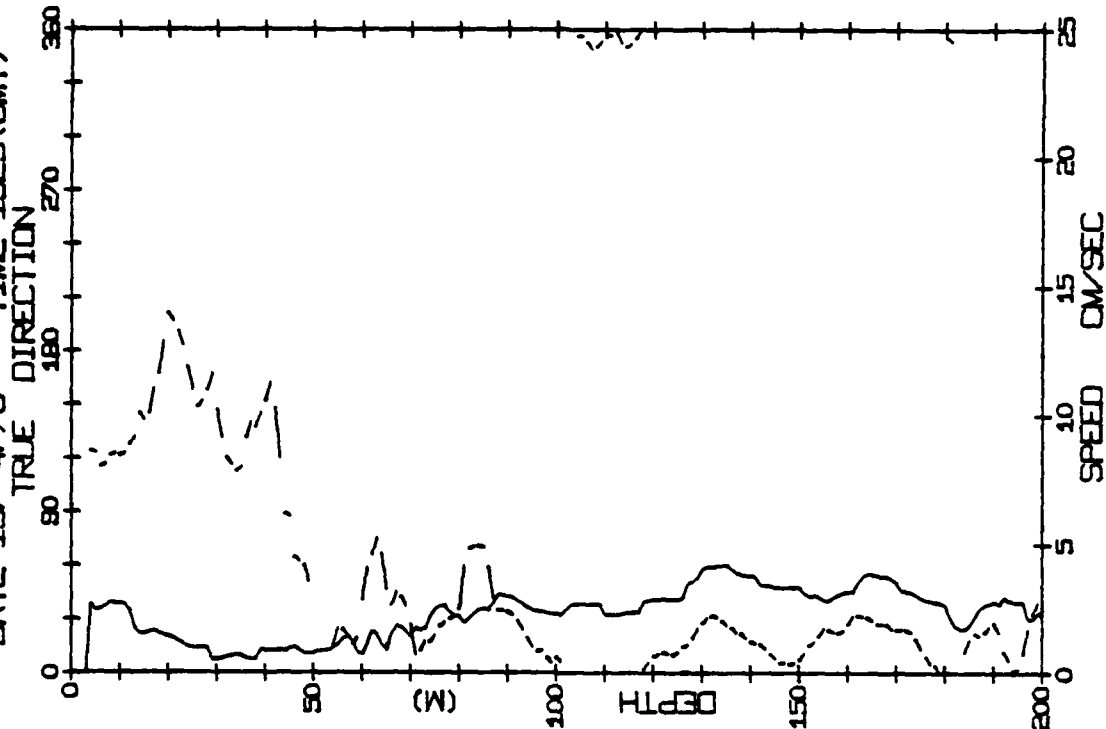
CAMP SNOWBIRD STATION 598
DATE 11/ 4/76 TIME 2016(GMT)



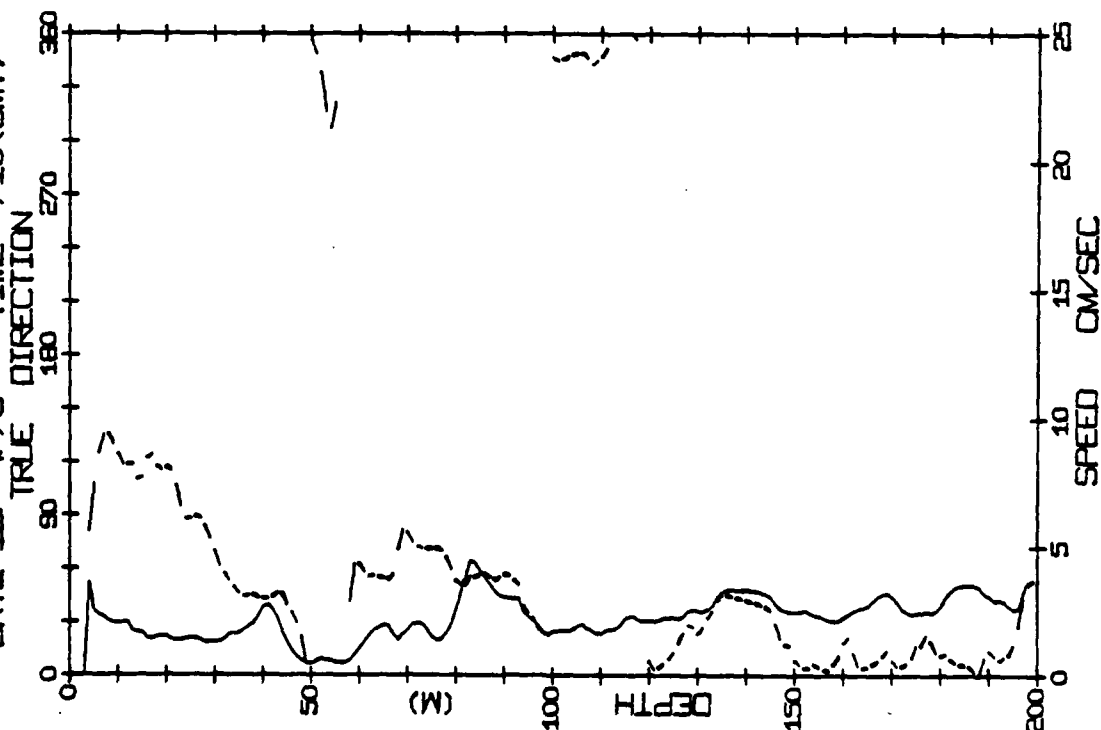
```
SNOWBIRD STATION 598      (200M )  11/APR/76  2016 GMT
LAT = 73.3806N      LONG = 146.1238W  LTER = 0    LGER = 0
NIVEL = 3.3      EIVEL = -12.4      NVER = 0    EVER = 0
```

[illegible][illegible]

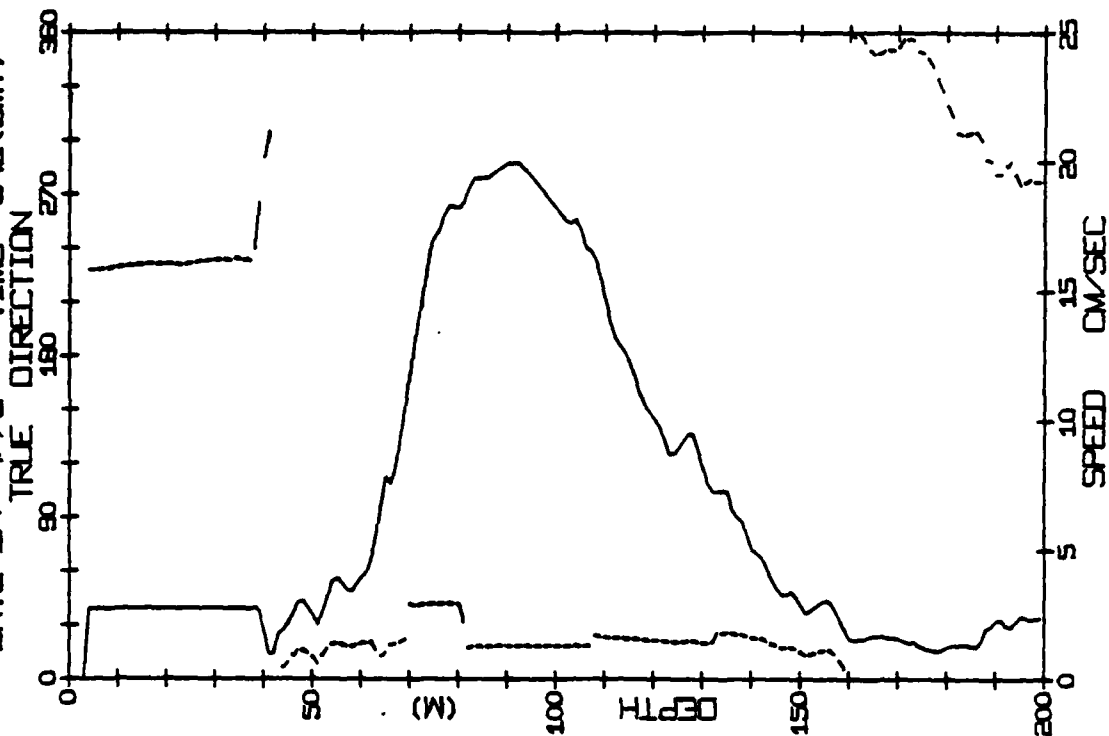
CAMP SNOWBIRD STATION 608
DATE 15/ 4/76 TIME 1929(GMT)



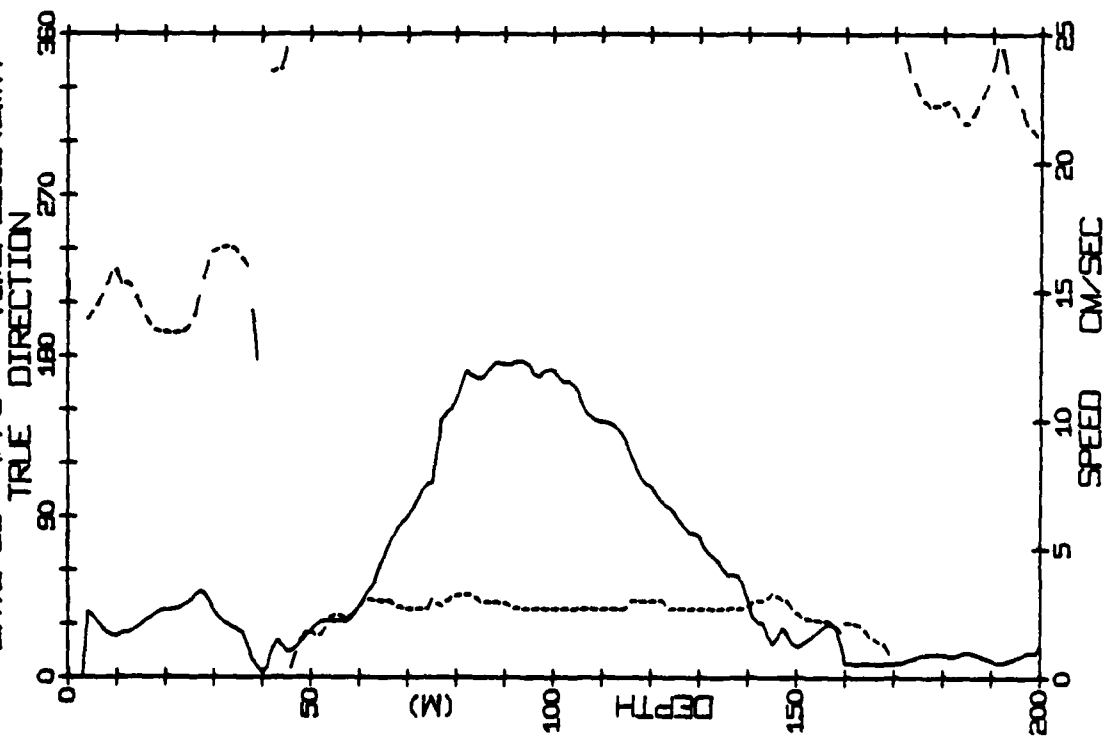
CAMP SNOWBIRD STATION 607
DATE 15/ 4/76 TIME 710(GMT)



CAMP SNOWBIRD STATION 612
DATE 17/ 4/76 TIME 642(GMT)

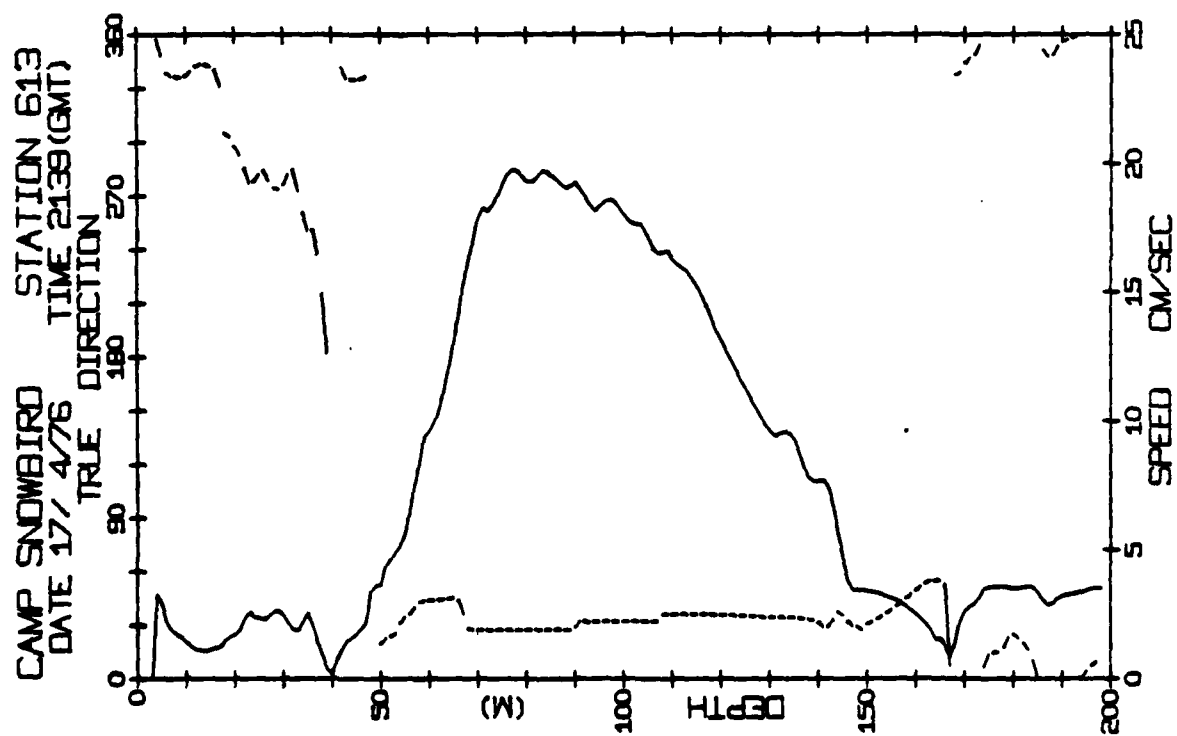
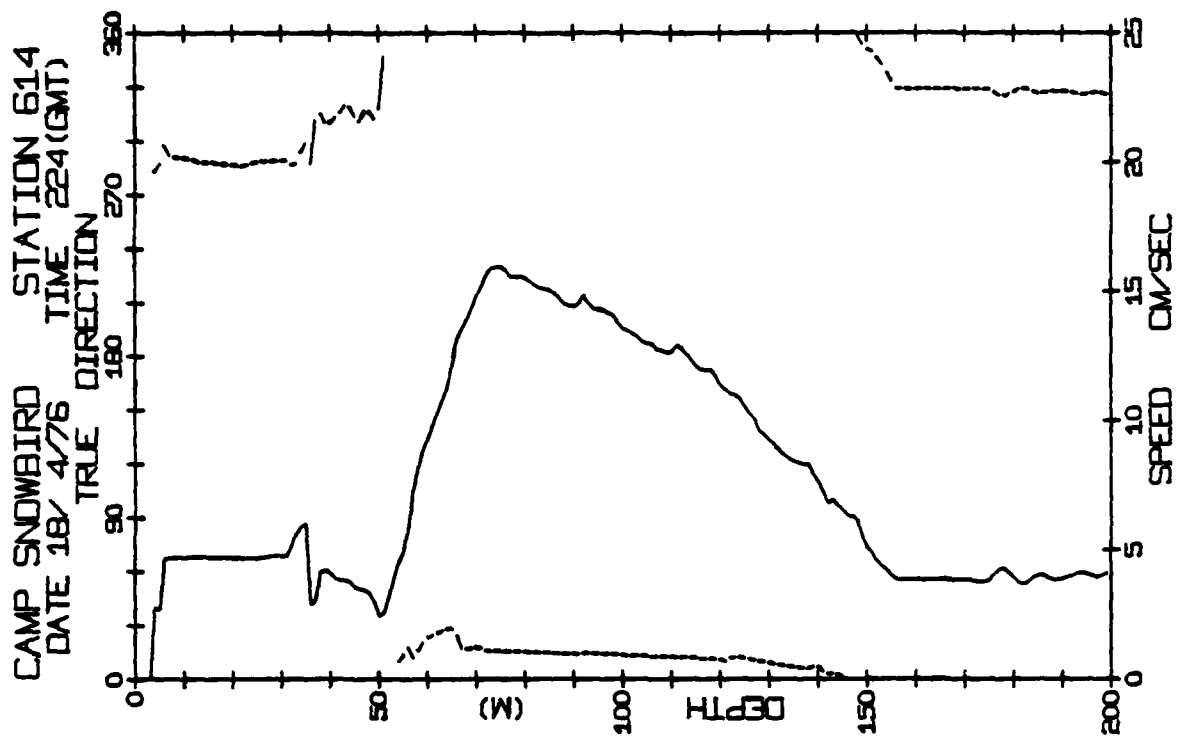


CAMP SNOWBIRD STATION 611
DATE 16/ 4/76 TIME 2239(GMT)



SNOWBIRD STATION 611 (200M.)
LAT= 73 426N LONG= 145 7297W
NIVEL= -1.4 EIVEL= -0.7

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 104

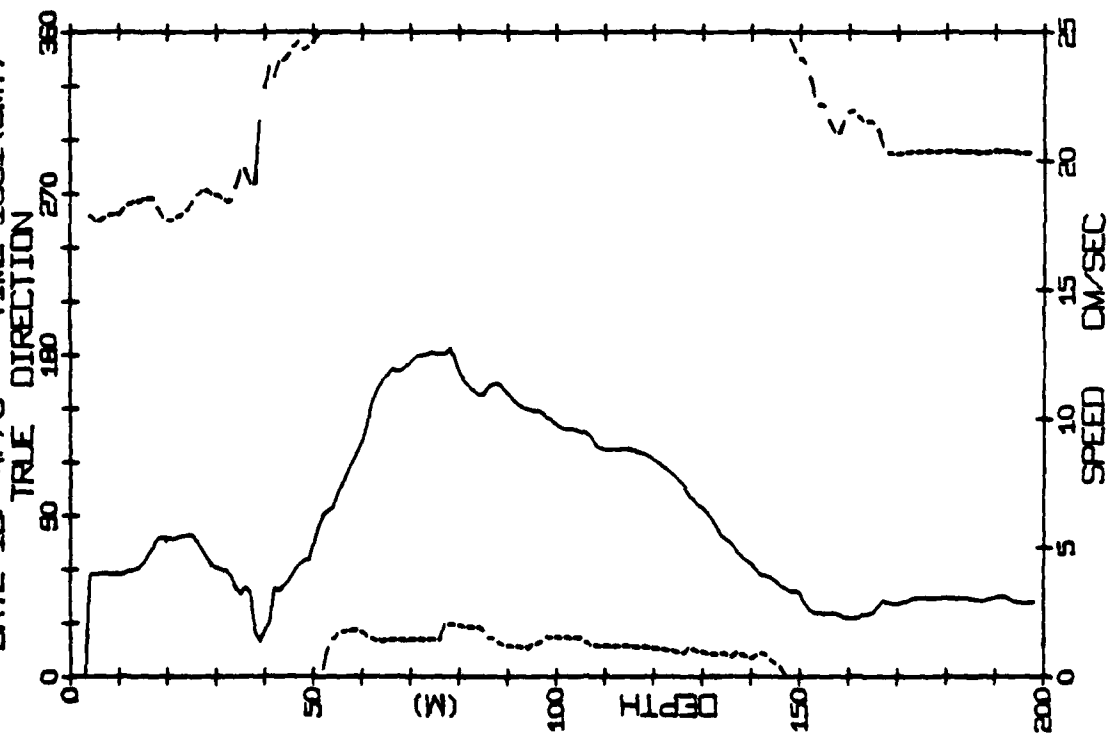


SNOWBIRD STATION 613 (198M) 17/APR/76 2139 GMT
LAT= 73.4291N LONG= 145.7323W LTER= 1. LGER= 2.
NINVEL= 2.1 EIVEL= 0.6 N'ER= 0. EVER= 0.

[illegible][illegible]

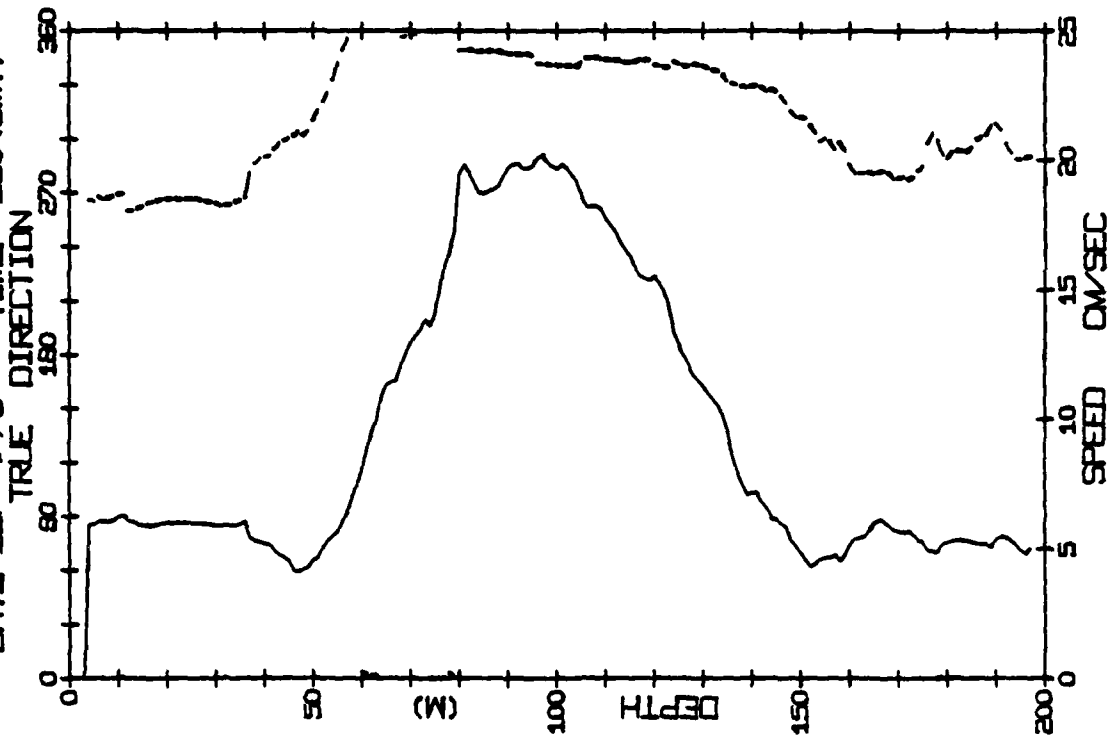
CAMP SNOWBIRD
DATE 18/ 4/76

STATION 615
TIME 1331 (GMT)



CAMP SNOWBIRD
DATE 19/ 4/76

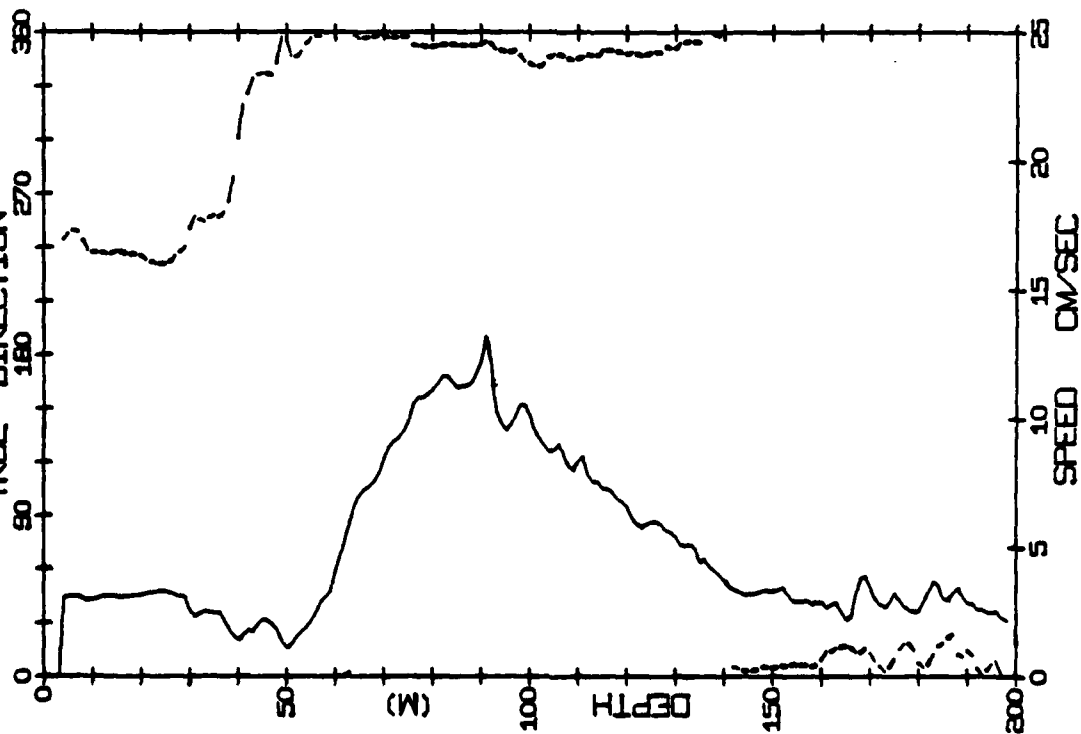
STATION 616
TIME 130 (GMT)



CAMP SNOWBIRD
DATE 19/ 4/76

STATION 617
TIME 1318 (GMT)

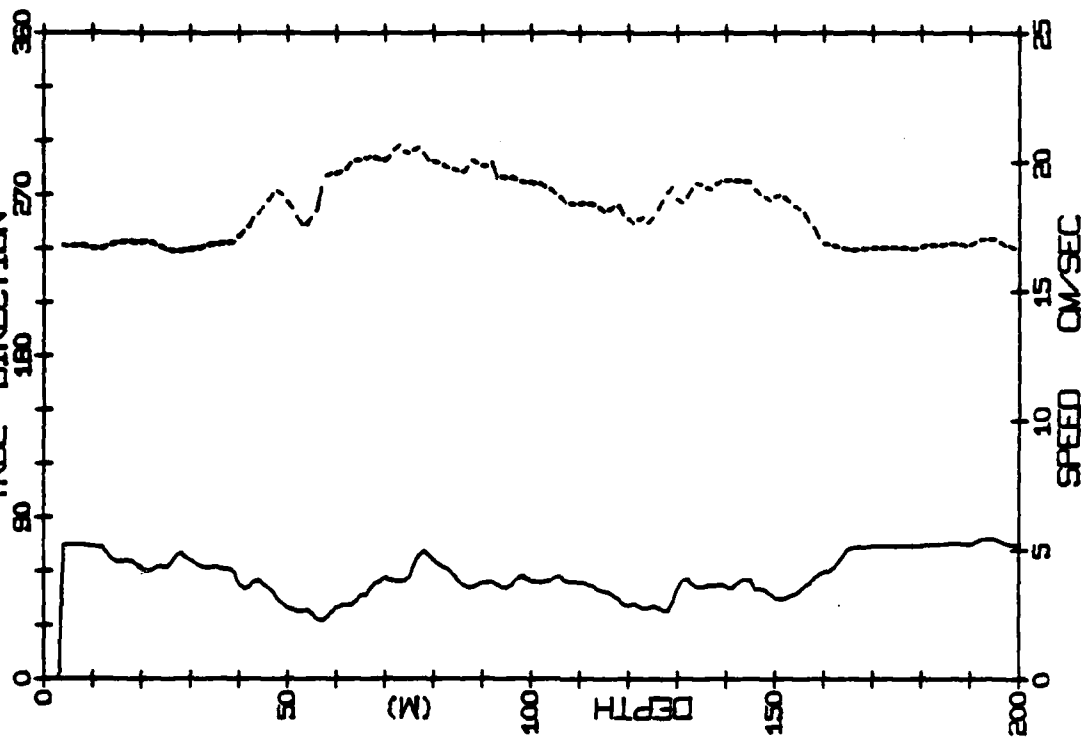
TRUE DIRECTION

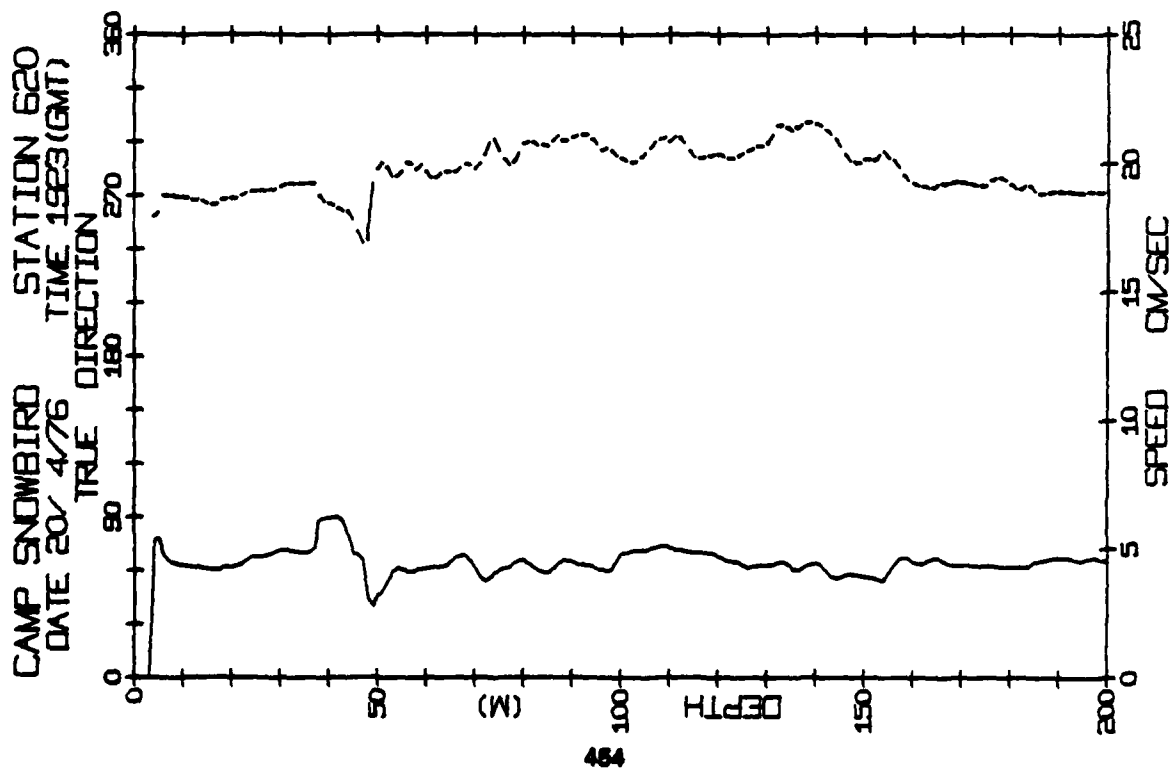


CAMP SNOWBIRD
DATE 20/ 4/76

STATION 618
TIME 1117 (GMT)

TRUE DIRECTION





DISTRIBUTION LIST

1 Division of Polar Programs
National Science Foundation
1800 G Street, N.W.
Washington, D.C. 20550

1 Director of Defense Research and Engineering
Office of the Secretary of Defense
Washington, D.C. 20301
Attn: Office, Assistant Director (Research)

Office of Naval Research
Arlington, VA. 22217

1 Attn: Code 102-C
1 Attn: Code 200
1 Attn: Code 428AR
3 Attn: Code 420

6 Director
Naval Research Laboratory
Washington, D.C. 20375
Attn: Library, Code 2620

1 U.S. Naval Research Laboratory
Code 2627
Washington, D.C. 20375

2 Office of Naval Research - N.Y.
715 Broadway
New York, N.Y. 10003

12 Defense Documentation Center
Cameron Station
Alexandria, VA. 22314

1 Commander
Naval Oceanographic Office
NSTL Station
Bay St. Louis, MS. 39522
Attn: Code 02

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER Tech. Rept. CU-6-80 Vol.3	2. GOVT ACCESSION NO. AD-A109 990	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Arctic Ice Dynamics Joint Experiment 1975-1976, Physical Oceanography Data Report, Profiling Current Meter Data, Camp Snowbird, Volume 3		5. TYPE OF REPORT & PERIOD COVERED
7. AUTHOR(s) T.O. Manley, Kenneth Hunkins, Werner Tiemann		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Lamont-Doherty Geological Observatory of Columbia University, Palisades, N.Y. 10964		8. CONTRACT OR GRANT NUMBER(s) N80012276-6-0004
11. CONTROLLING OFFICE NAME AND ADDRESS Department of the Navy, Office of Naval Research, Code 481, Arlington, VA. 22217		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NR 307-359
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE February, 1980
		13. NUMBER OF PAGES 455
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited. Reproduction in whole or in part is permitted for any purpose of the U. S. Government.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) AIDJEX, ocean currents, Arctic Ocean, mesoscale eddies, Ekman Drift.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The oceanographic program of the 1975-1976 ARCTIC ICE DYNAMIC JOINT EXPERIMENT (AIDJEX) was designed to investigate the Arctic Ocean on space scales of 100 kilometers in the horizontal and hun- dreds of meters in the vertical. This was accomplished with oceanographic observations from a triangular array of three smaller manned satellite camps with a centrally located larger main camp. The radio call signs of the satellite camps were Caribou, Blue Fox		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 65 IS OBSOLETE
S/N 0102-014-6601

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

and Snowbird; the main camp being designated Big Bear.

Profiles of relative current speed and direction were measured twice each day between the surface and 200 meters at each of the four camps. A profiling current meter (PCM) with speed, direction and depth sensors was lowered and retrieved with a multi-conductor cable at a slow rate of 5 meters per minute. Sensor signals were transmitted by cable to be recorded graphically and digitally at the surface. Digital recording of the data at a slow rate of 1 scan per half minute along with a low signal-to noise ratio made it preferable to manually digitize the analog charts to preserve as much information as possible.

The final data set, consisting of absolute velocity profiles of speed and direction, was obtained by the vector addition of the relative PCM profiles with the interpolated ice velocity based on precise satellite navigation at the time of the observation. Data reduction problems included a hysteresis effect between the up and down traces due to cable angle, directional spikes resulting from a rapid sensor package rotation, and spurious results when low velocities are added vectorially.

Relative speed between the ice and water in the upper mixed layer is often small, indicating that this layer closely follows the ice motion. Persistent large clockwise shears in relative current direction occur sometimes in the mixed layer, attaining up to 540 degrees of rotation. These are best seen in the relative velocity data. Upon the addition of the ice velocity vector, to produce absolute velocities, the smooth relative directional shear of the Ekman spiral exhibits local shears and speed minimums. This is due to the directions and speeds in the spiral being opposite or nearly opposite to the ice velocity vector and of comparable magnitude.

One of the most striking features of the current profiles is the appearance from time to time of swift currents below the mixed layer with speeds attaining 60 cm/sec. The depth of maximum velocity ranges from 80 to 190 meters. Although evidence of swift transient undercurrents had been observed in the Arctic Ocean as early as 1937, it was not until 1974 that these currents were shown to be associated with mesoscale eddies.

This Data report deals only with the absolute velocity data obtained from the profiling current meter at Camp Snowbird. PCM data for Camps Blue Fox, Big Bear and Caribou are in separate volumes (Manley et al., 1980). Data reports pertaining to the salinity-temperature-depth (STD) data taken at the manned AIDJEX camps are also in separate volumes (Bauer et al., 1980).

ATE
LME